V. BASIN DESCRIPTION

5.1 Geography and Climate

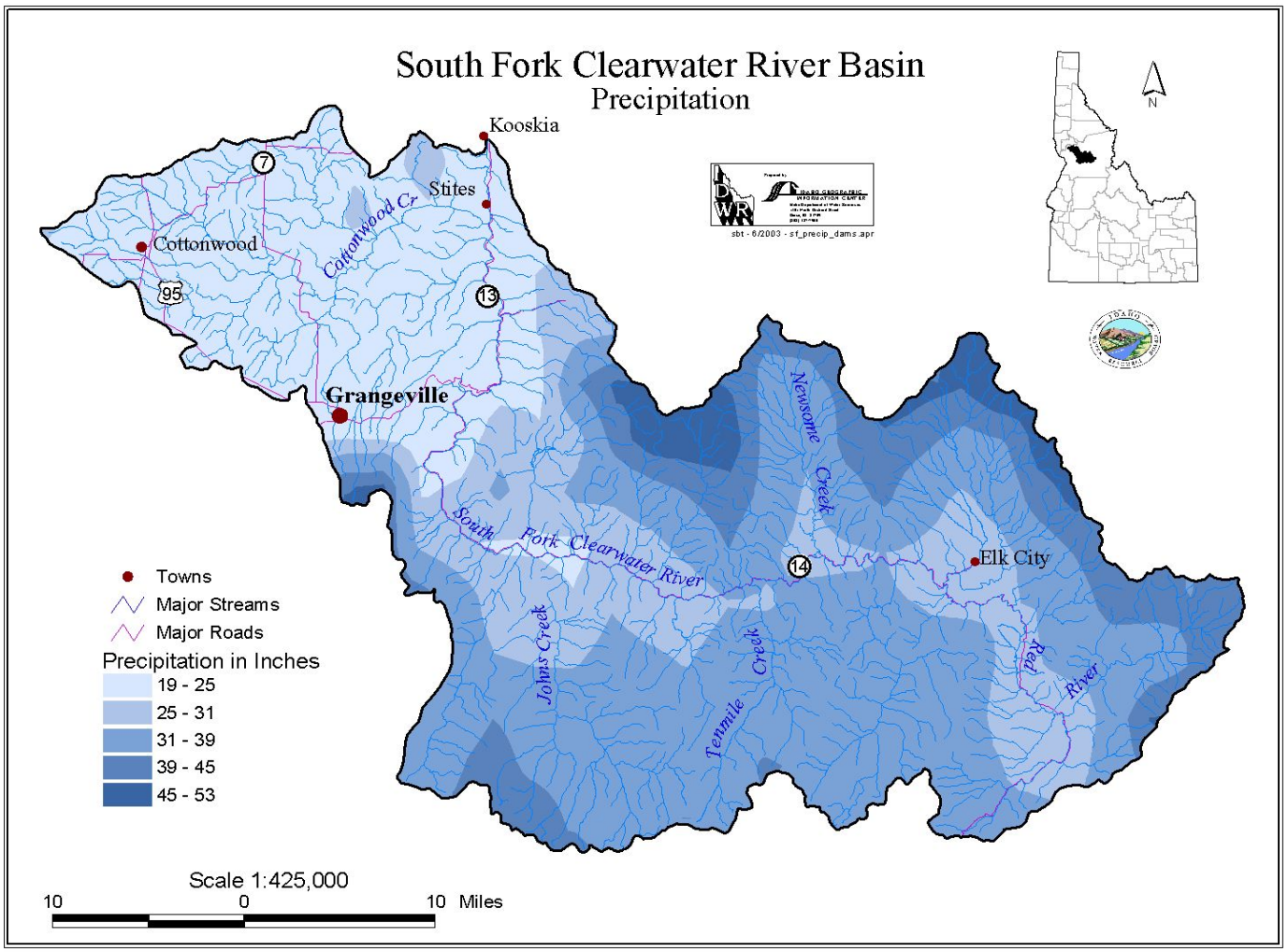
The South Fork Clearwater River subbasin (U.S. Geological Survey Hydrologic Unit 17060305) extends from the headwaters above Elk City and Red River to the confluence with the Middle Fork of the Clearwater River at Kooskia.

The river basin is within the Northern Rocky Mountain physiographic province (Savage 1967). Lowlands of the river valley and the basin are flanked by the uplands to the west, and the mountain range and uplands to the east. Elevation within the basin ranges from 1,280 feet at the confluence of the South Fork Clearwater River and Middle Fork Clearwater at Kooskia to over 6,000 feet in the mountains.

Climate within the basin is dominated by Pacific maritime air masses and prevailing westerly winds. Over 85% of the annual precipitation occurs during the fall, winter and spring months. Cyclonic storms consisting of a series of frontal systems moving east produce long duration, low-intensity precipitation during this portion of the year. In winter and spring, this inland maritime regime is characterized by prolonged gentle rains, fog, cloudiness and high humidity. The climate during the summer months is influenced by stationary high-pressure systems over the northwest coast. These warm dry systems result in only 10 to 15% of the annual precipitation falling during the summer. Climate station information is summarized in Table 9. Summers and winters are relatively mild due to the Pacific maritime influence. However, conditions can vary locally due to the wide range in elevation and terrain features. (TMDL 5,6)

Annual precipitation ranges from about 22 inches on the Camas Prairie in the mid to lower basin to more than 50 inches along the higher ridges in the upper reaches of the basin (Map 3). July and August are the driest months, whereas the greatest amounts of precipitation occur between December and March (Fig. 8). Snowfall during the winter is heavy in the mountains and can be heavy on the Camas Prairie.

Annual runoff from the South Fork Clearwater River basin averages about 739,000 AF, as measured by the USGS stream gage at Stites. (NPFLA) The mean annual stream flow is 1,060 cfs. Stream flows are highest in May with an average of 3,370 cfs with lowest flows the September average of 258 cfs (TMDL).



Map 4. Precipitation

Table 9. Climate factors at Elk City, Grangeville and Kooskia.

Climate Factor	Elk City	Grangeville	Kooskia
Elevation (ft.)	4,060	3,360	1,280
Annual Precipitation (in.)	30.2	23.8	24.2
Annual Snowfall (in.)	133.4	53.4	22.5
Average January Precipitation (in.)	3.51	1.62	2.05
Average January Minimum Temp (°F)	10.1	21.3	22.7
Average January Maximum Temp (°F)	34	37	37.5
Average July Precipitation (in.)	1.46	1.17	1.04
Average July Minimum Temp (°F)	40.6	49.7	51
Average July Maximum Temp (°F)	80.6	81.5	91.2

Climatological summary data, 1961-1990 (Natural Resources Conservation Service, National Water and Climate Center, internet site).

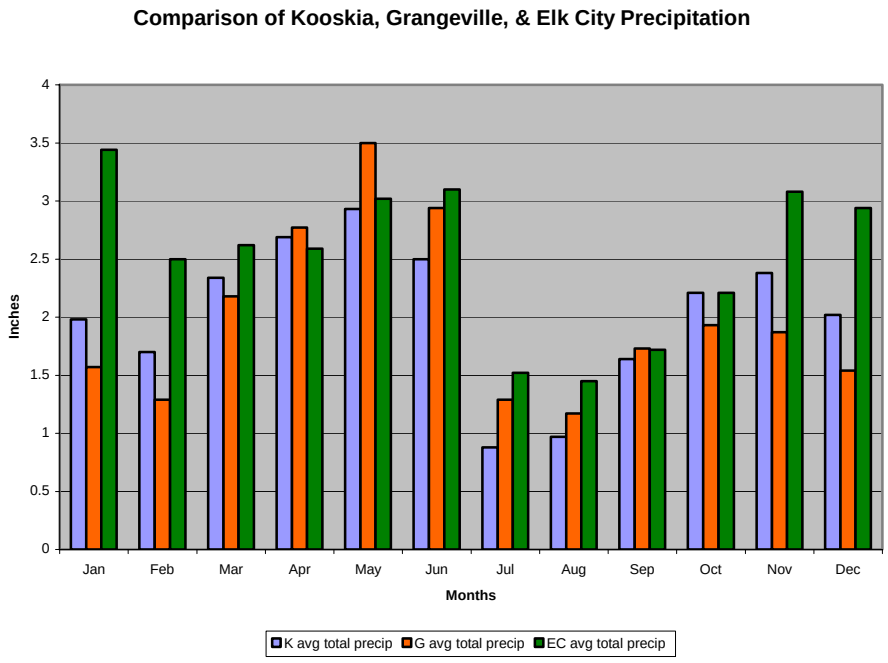


Fig.8. Comparison of precipitation at Kooskia, Grangeville and Elk City.

5.2 Geology and Soils

The Idaho Batholith formed in the Late Cretaceous age (75-100 million years old). The batholith and the activities that formed it were a product of the subduction of the Pacific Plate beneath North America during Cretaceous time (Alt and Hyndman 1989). The Idaho Batholith of central Idaho is not as continuous or as uniform as once believed. The batholith is composed of the Atlanta Batholith and the Bitteroot Batholith. A portion of the South Fork Clearwater River basin is within the Atlanta Batholith and the mainstem South Fork Clearwater River is underlain by granite (Alt and Hyndman 1989). Columbia River basalt (4-17 million years old) is also visible in the basin.

The Camas Prairie region of the basin is relatively uniform in soil composition and geology (Maps 5 and 6). The mountainous region of the basin is composed of granitic soils and is subject to increased erosion rates following disturbance (Megahan and Ketcheson 1996).

Landform groups are ecological units that describe patterns of soils, geology, climate and vegetation (IDEQ 2002). The South Fork Clearwater River basin is composed of seven landform groups. Landform group 1 is less than 1% of the basin area (IDEQ 2002). It occurs along headwater streams south and east of Grangeville and is primarily low rolling hills, derived from Columbia River basalt. The parent material is grandorite. Sediment hazard from substrate erosion is very high.

Landform group 2 comprises about 56% of the basin (IDEQ 2002). This landform is rolling uplands and occurs east of Grangeville. It does not include the headwater streams and the mainstem South Fork Clearwater River . The parent material is granite, gneiss, schist and quartzite. Erosion hazard is moderate to high.

Landform 3 includes the middle reach of the mainstem and the lower reaches of Mill Creek, Johns Creek, Tenmile Creek Crooked River and Peasley Creek and is about 12% of the basin. It is characterized by breaklands. The parent material is also granite, gneiss, schist and quartzite (IDEQ 2002). Erosion hazard is moderate to high.

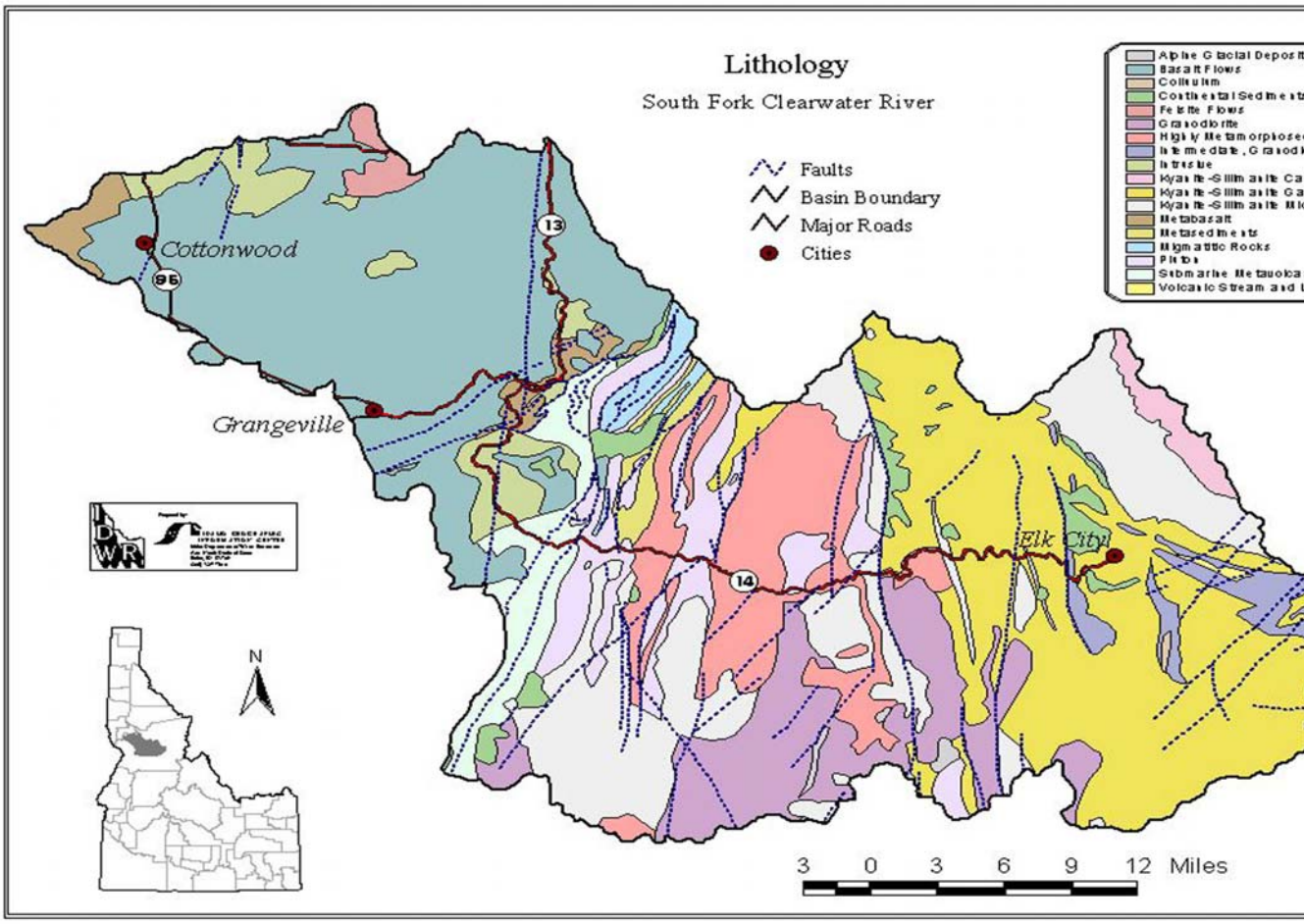
Landform 4 includes the upper reaches of Tenmile Creek and Johns Creek in the Gospel Hump Wilderness (IDEQ 2002). Landform 4 is characterized by ice-scoured cirques and glacial troughs and is about 5% of the basin (IDEQ 2002). Parent material is quartzite and diorite. Erosion hazard is low to high.

Landform 5 is primarily forested rolling hills, plateaus and is about 1% of the basin (IDEQ 2002). Basalt is the parent material. Erosion hazard is low.

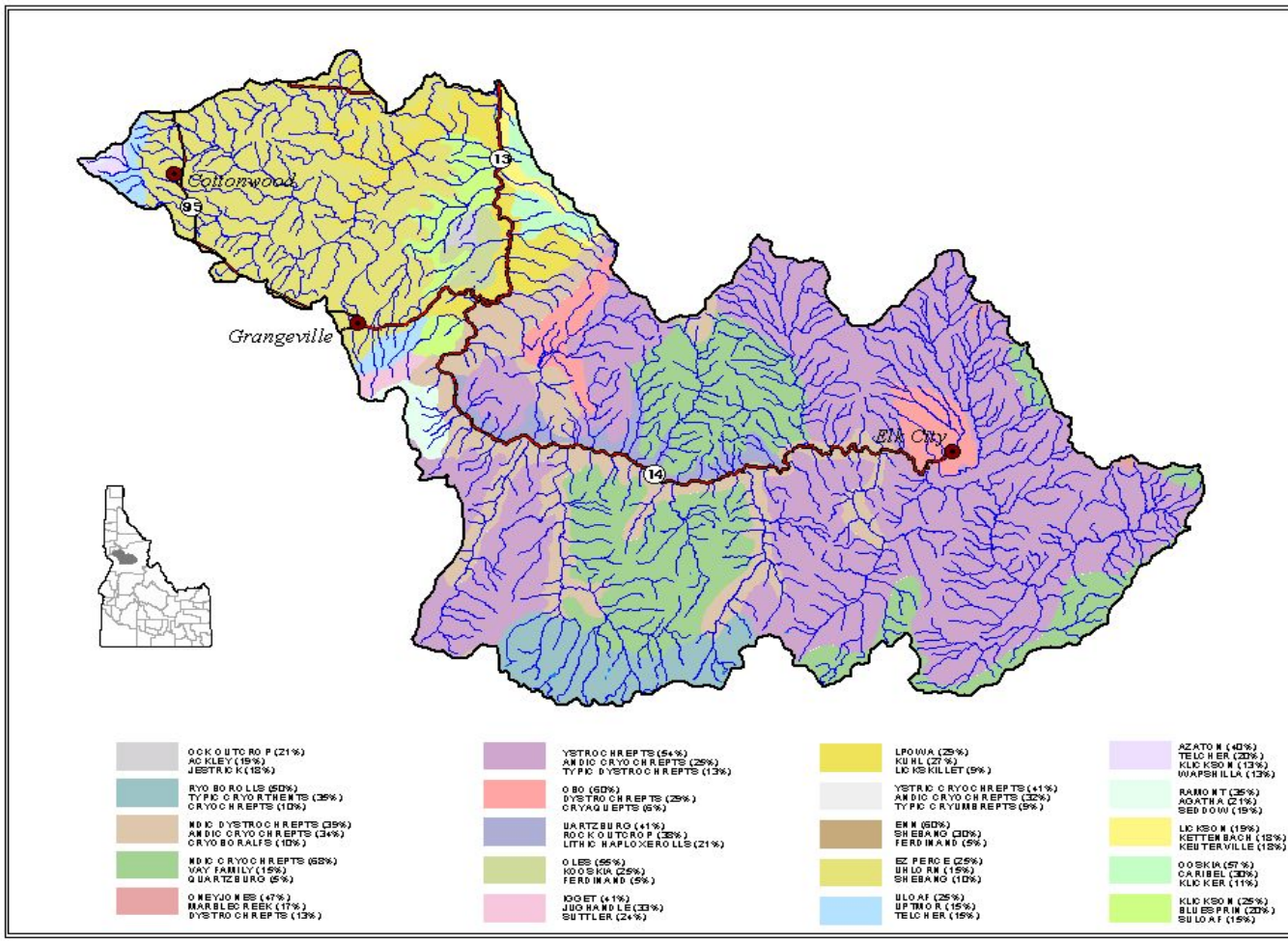
Landform 6 is characterized by steep mountain slopes and stream breaklands and is approximately 65% of the basin (IDEQ 2002). Parent material is basalt and erosion hazard is low under natural, undisturbed conditions.

Landform 7 is rolling plateaus and prairie (IDEQ 2002). It is about 20% of the basin and includes the Camas Prairie. Parent material is basalt and the erosion hazard is low.

Soils (see Map 6) in the Idaho Batholith are coarse-textured and as mentioned, most have high erosion potential (Clayton and Megahan 1997).



Map 5. Lithology


Cottonwood
Grangeville
Elk City
95
13
14
OCKOUTCROP (21%)
ACKLEY (19%)
JESTRICK (18%)
RYOBOROLLS (50%)
TYPIC CRYORTHENTS (35%)
CRYOCHREPTS (10%)
MDIC DYSTROCHREPTS (35%)
AMDIC CRYOCHREPTS (34%)
CRYOBORALFS (10%)
MDIC CRYOCHREPTS (68%)
VAY FAMILY (15%)
QUARTZBURG (5%)
OMEYJONES (47%)
MARBLEC REEK (17%)
DYSTROCHREPTS (13%)
YSTROCHREPTS (54%)
AMDIC CRYOCHREPTS (25%)
TYPIC DYSTROCHREPTS (13%)
OBO (60%)
DYSTROCHREPTS (25%)
CRYAQUEPTS (5%)
UARTZBURG (41%)
ROCKOUTCROP (38%)
LITHIC HAPLOXEROLLS (21%)
OLES (55%)
KOOSKIA (25%)
FERDINAND (5%)
IGGET (41%)
JUGHANDLE (33%)
SUTTLER (24%)
LPOWA (25%)
KUHL (27%)
LICKSKILLET (5%)
YSTROCRYOCHREPTS (41%)
AMDIC CRYOCHREPTS (32%)
TYPIC CRYUMBREPTS (8%)
ENN (60%)
SHEBANG (30%)
FERDINAND (5%)
EZ PERCE (25%)
UHLORN (15%)
SHEBANG (10%)
ULOAF (25%)
UPTMOR (15%)
TELCHER (15%)
AZATOM (40%)
TELCHER (30%)
KLICKSON (13%)
WAPSHILLA (13%)
RAMONT (35%)
AGATHA (21%)
SEDDOW (15%)
LICKSON (15%)
KETTENBACH (15%)
KEUTERVILLE (15%)
OOSKIA (57%)
CARIBEL (30%)
KLICKER (11%)
KLICKSON (25%)
BLUESPRIN (20%)
SULOAF (15%)

Map 6. Soils

5.3 Land Ownership and Use

Ownership and land use in the basin are shown in Map 7 and summarized in Table10.

Table 10. Land ownership by area.

Land Type	Area
Public Land	
Federal Agency Management	532,691 acres
State of Idaho Management	4,832 acres
Private Land	217,703 acres
Nez Perce Tribe	565 acres

The present pattern of vegetation cover and use are displayed in Map 9. Publicly owned forested lands within the basin, excluding special management areas, are managed primarily for timber production. Predominant tree associations are Ponderosa Pine, Douglas Fir and Lodgepole Pine.

Some livestock grazing occurs on public lands (see stock water section). Though grazing is not a primary land use within the basin, it is important to permit and lease holders. About 220,000 acres of grazing allotments on public land are leased to provide animal unit months of grazing activity. However, of the land in those allotments, approximately 106,000 acres are suitable for grazing.

Land ownership on the Camas plateau area in the northwestern portion of the basin is mostly private. This area of the basin encompasses about 144,280 acres and the predominant land use is agricultural cropland and pasture.

Special management areas include relatively pristine forested lands, and wetland communities managed as Research Natural Areas, scenic and recreation areas, and wilderness areas in the upper reaches of the basin. The USFS determined that the South Fork Clearwater River is eligible for recreational river designation under the national Wild and Scenic Rivers Act and Johns Creek is eligible for wild river designation. The river corridors are managed to protect these classification until the rivers are studied for suitability and Congress acts on the designations.

5.4 Basin Demographics

Estimates of population, housing, income, employment, and unemployment are used to describe the demographic and economic characteristics of the basin. Data for this section were obtained primarily from the U. S. Census Bureau and the Idaho Department of Commerce (IDC). Specific information regarding agriculture, timber, mining, and recreation was compiled by IDWR to meet the needs of this plan. Demand for water depends on the levels and patterns of demographic and economic activities in the South Fork Clearwater River basin.

The South Fork Clearwater River basin encompasses about 14% of Idaho County. County level data may not be a precise picture of local demographic and economic conditions within the basin. However, it is likely representative.

5.4.1 Population

Idaho County had a population of 15,423 in 2001 (IDC 2001). It is first in area among Idaho's 44 counties but ranks 19th in population. In contrast, Ada County, which includes Boise, is 31st in area and first in popula tion. It is estimated that the population of the basin in 2000

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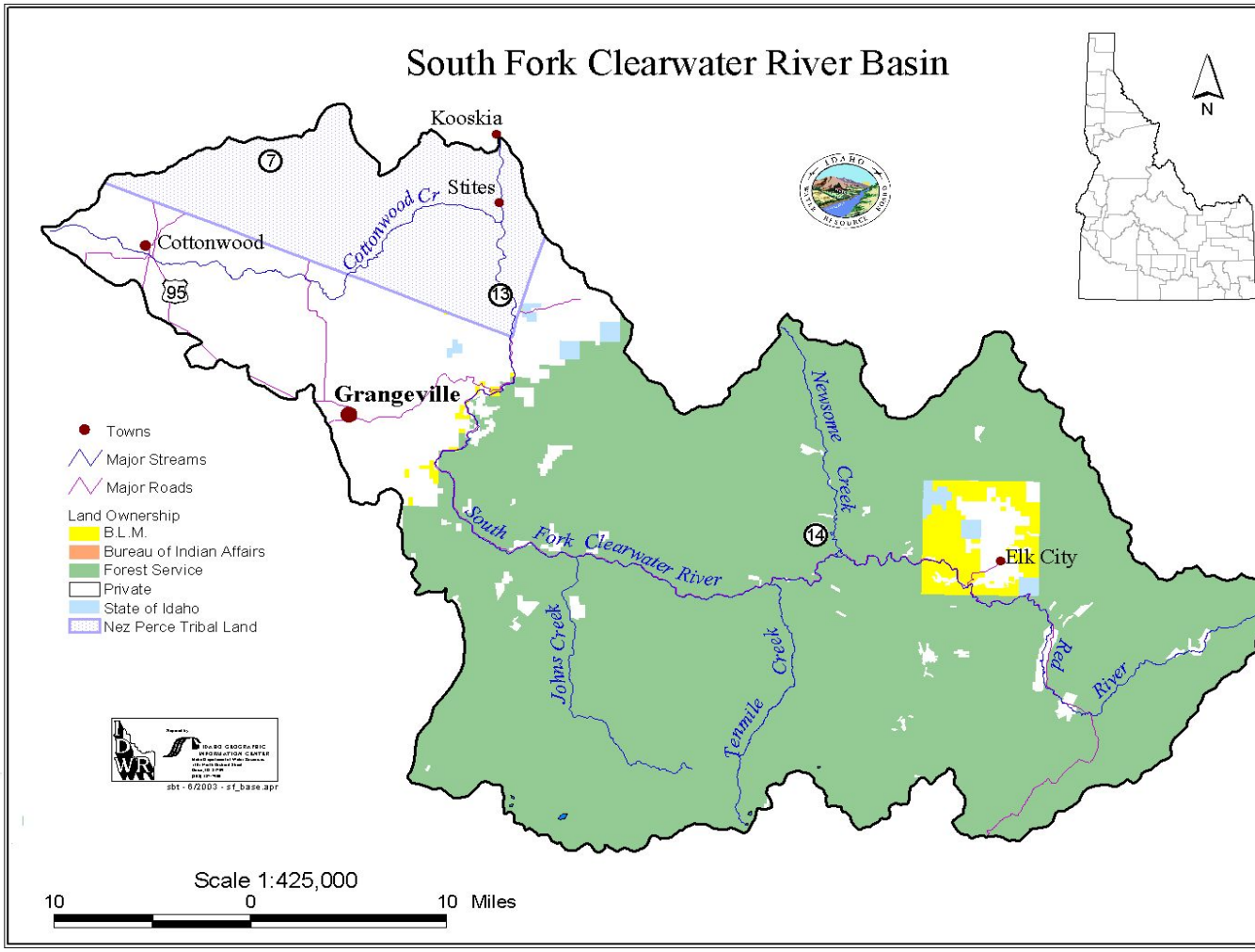


Map 7. Land Ownership

was less than 14,900. The population of the county is projected to be about 17,690 by 2025 for an annual growth rate of 0.5% (Church 2002). The number of households in the county was 6,100 in 2001 (Idaho Power 2002). The number of households was projected to be 7,120 in 2025 (Church 2002). In the county, about 79% of the population in 2000 was rural. In Ada County in 2000, 93% of the population was urban.

The birth rate in Idaho County declined from 17.6 in 1980 to 10.2 in 2000. Birth rate is expressed as the number of live births per year per 1,000 population. The median age of the population has increased in the county from 30.3 in 1980 to 42.3 in 2000, which could indicate that young adults are migrating to urban areas to find work. The number of deaths in the county increased from 1,200 during the 1970-1980 period to 1,417 in the 1990-2000 time frame. Net migration was 1,534 from 1990 to 2000.

Grangeville is the largest incorporated city in the South Fork Clearwater River basin with a population of 3,228 in 2000. (Table 11). The population of Idaho increased 55% from 1970 to 2000 but all of the cities in the basin, except Cottonwood, lost population during this period (IDC 2001).

Table 11. City population trends in the South Fork Clearwater River basin (IDC 2001).

City	1970	1980	1990	2000
Cottonwood	867	941	822	944
Grangeville	3,636	3,666	3,226	3,228
Kooskia	809	784	692	675
Stites	263	253	205	226
Totals	5,575	5,644	4,945	5,073

All cities in the basin lost population during the 1980s. The loss of population in the 1980s corresponds to a period when rural areas in Idaho were experiencing significant recession (IDWR 1999). Idaho County lost population during the 1980s (IDC 2001).

5.4.2 Economics

Annual unemployment rates in Idaho County were 12.7%, 9.0% and 10% in 1980, 1990 and 2002, respectively (Table12). This contrasts to Ada County's unemployment rates of 6.6%, 4.0%, and 4.5 % for the same years. Fremont County, with about 72% of the population designated rural, and with a similar population size, had a lower unemployment rate of 6.2% in

Table 12. Selected Idaho counties' unemployment rates (IDC 2003).

County	1980	1990	2002
Idaho	12.7	9.0	10
Fremont	7.8	8.7	6.2
Madison	5.4	5.1	2.1
Adams	16.5	12.7	14.2
Clearwater	16.1	13.9	15
Lewis	10.4	8.3	8.7
Ada	6.6	4.0	4.5
State	7.9	5.9	5.8

2002. However, many of Fremont County's' residents (more than 25%) living in the south end of the county, travel to nearby Madison County to work (IDC 2001). Madison County historically has had relatively low unemployment rates. The counties surrounding Idaho County are rural and also have high unemployment rates. Clearwater, Lewis and Adams Counties all have had higher unemployment rates historically than the state as a whole.

Per capita personal income in Idaho County was $17,690 in 1999. In adjacent Adams and Clearwater Counties, per capita income in 1999 was $18,212 and $18,429, respectively. For Idaho, per capita income was $22,871 in 1999.

Services, retail, manufacturing, state and local government and farm were the top employment industries in Idaho County in 1999 (Table13). Service industries employed the most people. All government entities (federal, state and local) employed the next greatest number of people. Of the total 5,153 employed residents, 786 worked in adjacent counties.

Two lumber mills in the basin, Bennett Forest Industries and Clearwater Forest Industries (CFI), employ most of the workers in the manufacturing sector. Bennett is located near Elk City and CFI is in Kooskia.

Table 13. Employment by industry in Idaho County.

Industry	1980	1990	1999
Farm	960	831	961
Manufacturing	1,206	1,210	982
Mining	33	111	95
Construction	278	294	566
Retail Trade	754	905	1,099
Services	888	1,117	1,511
Federal Civilian	583	599	459
State and Local Government	606	732	930

According to U. S. Department of Agriculture statistics (1997), in Idaho County a total of 661 farms sold over $32 million of agricultural products in 1997 (Table 14).

Table 14. Market value of major agricultural goods in Idaho County (USDA 1997).

	Value ($1,000)		
Crop*	1987	1992	1997
Wheat	11,218	10,515	11,963
Barley	3,379	1,429	3,977
Hay, silage and field seeds	1,652	806	1,818
Livestock, poultry	15,860	15,932	13,598
Hogs and pigs	1,544	1,330	462
Sheep, lambs and wool	413	531	240

*By North American Industry Classification System

Water demand for domestic and municipal uses is not expected to grow much in the basin because of the expected low population growth. Water use should not shift from agricultural to municipal because demographics in the basin are likely to remain stable.

In summary, Idaho County is a rural area with low population and a slow growth rate. The population growth rate is expected to remain low. The unemployment rate is consistently high. Water demand will not greatly increase nor will there likely be a major redistribution of consumptive water use from agriculture to domestic or municipal.

5.5 Other Water Resources

Stream Channel Protection

Stream channel activity in all continuously flowing streams within the State of Idaho requires a Stream Alteration Permit from IDWR, unless the work is exempt. The permit is required by the Idaho Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code. The Act requires that the stream channels of the state and their environment be protected against alteration for the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, and water quality. A stream channel alteration is any activity that will obstruct, diminish, destroy, alter, modify, relocate, or change the natural existing shape or direction of water flow of any stream channel. A Joint Application can be made for this permit, USACE permits, and Idaho Department of Lands permits. The South Fork Clearwater River basin is administered by the Northern Region of IDWR.

Local

To participate in the National Flood Insurance Program, a community must adopt and enforce a floodplain management ordinance that regulates development in the community's floodplain. Idaho County adopted a Flood Damage Prevention Ordinance (#36) on April 14, 1997. Idaho County's date of entry into the program was May 2, 1997, and the effective date of the current Flood Insurance Rate Maps was August 23, 2001. The Floodplain Administrator is designated by the Idaho County Commissioners.

Cities participating in the National Flood Insurance Program, their dates of entry and current effective map dates are: Cottonwood, 5/1/85; Grangeville, 6/1/84; Kooskia, 3/18/85; and Stites, 4/15/88. The mayor or another city official usually is designated as the community's floodplain administrator.

Additional Information

Additional information on flood programs is on the IDWR website (www.idwr.state.id.us/). The National Flood Insurance Program is covered along with agency programs related to flood warning and forecasting, flood control, floodplain management, and flood disaster recovery and mitigation. In addition, Flood Risk Reduction and Management Alternative programs are included that provide assistance to local communities in reducing their flood risks and damages.

Geothermal Water

Idaho ranks third in the nation for the number of active geothermal springs. The majority of the geothermal wells and springs are found in the central and southern parts of the state where.

An Internet web site has been created to provide information and data about geothermal resources in the state. The site provides access to a wealth of geothermal information including an interactive mapping program that can pinpoint and provide data about geothermal resources around the state. A new technical report on geothermal potential at some selected sites in Idaho is also available via the web site. The Internet address for the web site is: www.idahogeothermal.org.

Because of the special value of geothermal resources, they are protected through Idaho statutes. Geothermal resources are defined Geothermal Resources Act (Idaho Code Title 42-40) as either low temperature geothermal (86 to 212 degrees Fahrenheit) or geothermal (greater than 212 degrees Fahrenheit). Rules for drilling for geothermal resources can be found at Drilling for Geothermal Resources Rules (IDAPA 37.03.04) and Well Construction Standards Rules (IDAPA 37.04.09). In the basin there are some geothermal sites (see website), but they are not as abundant as in the Salmon River drainage, for example.

5.6 Water Quality

Historic Surface Water Quality Impacts

Some cultivation and grazing has occurred in the basin since the mid-1800s. Gold was discovered in 1861, with active and intense hydraulic and dredge mining occurring intermittently through the 1950s (IDEQ et al. 2003). Glory holes left after hydraulic mining have drastically altered the landscape and continue to contribute significantly to accelerated erosion and sediment loads to basin streams. Timber harvest began in the mid to late 1800s in association with mining activities. Homesteaders arrived in late 1800s and early 1900s. All of these human activities (road construction, mining, timber harvest, building construction, agriculture, and grazing) have led to increased surface erosion and sediment loading to the South Fork Clearwater River and tributaries (IDEQ et al. 2003).

A number of studies have been conducted over the last 40 years, looking at impacts to water quality and fish and wildlife. IDFG identified low flows and high stream temperatures as problems for the Cottonwood Creek drainage as early as 1962. A 1984 assessment by BLM showed poor condition in this drainage due to lack of riparian vegetation and degraded streambanks (IDEQ et al. 2000). The impacts of mining, road building, logging, grazing, and channel alteration on fish and aquatic habitat within the Nez Perce NF have been a long-time concern. Mitigation efforts were undertaken in the 1980s to reduce sediment delivery and improve habitat, with limited success.

Water Quality Limited Water Bodies

Section 303(d) of the Federal Clean Water Act requires states to list water bodies that are impacted by one or more pollutants. These water bodies cannot meet water quality standards for designated uses despite point source technologies. States must develop budgets for listed water bodies that determine the maximum loadings of pollutants of concern (incorporating seasonal variation and a margin of safety). Loads include both point and nonpoint sources contributing to the water body, and the maximum load must be consistent with water quality standards and designated uses. These budgets, or Total Maximum Daily Loads (TMDLs), must be approved by EPA and then become the basis for implementation plans to restore the water quality to a level that supports its designated uses.

The most current approved listing of impacted Idaho water bodies is presented in the *1998 303(d) List* (additions to the list by EPA in 2000) (IDEQ 1998). The list contains stream segments with designated uses that are deemed impaired by one or more pollutants or stressors. The 303(d) list provides a mechanism for the state to prioritize cleanup of water quality problems. Streams on the list are required to have a TMDL established within certain dates, or basin assessments demonstrating that beneficial uses are fully supported and therefore not requiring TMDL development. Impacted rivers and streams in the South Fork Clearwater River basin are presented in Table 16. A TMDL addressing the Cottonwood Creek drainage was developed in 1999 and approved by EPA in 2000. The Nez Perce Tribe has a Nonpoint Source Coordinator working with

landowners and farmers on BMPs on the Nez Perce Reservation, including the Cottonwood Watershed, to meet TMDL targets.

Sources of pollutants in this subbasin include practices associated with agriculture, grazing, and forestry; stormwater runoff; roads; failing septic systems; and a WWTP (wastewater treatment plant)(IDEQ et al. 2000). Causes of impacts to beneficial uses are hydrologic modifications from change in vegetation cover, increase in drainage density, annual cropping tillage practices, unrestricted access by livestock, roads, right-of-way farming, AFOs (Animal Feeding Operations), failed septic systems, stream channel modifications, low canopy cover, low plant density, erosion, and storm runoff (IDEQ et al. 2001). The Idaho Soil and Water Conservation District's (ISWCD) State Agricultural Water Quality Project (SAWQP) established priority areas and appropriate Best Management Practices (BMPs) to reduce pollutant contributions within the drainage (ISWCD 2001). Programs, best management practices, and monitoring that will be used to restore beneficial uses (Table 15) to the Cottonwood Creek drainage are outlined in the implementation plan (IDEQ et al. 2001). The plan includes establishment of critical treatment units for croplands, riparian areas, animal feeding operations, and roads (approximately 75% of land area of basin, based on ISWCD SAWQP). Subwatershed priorities are South Fork Cottonwood, Stockney, Long Haul, Shebang, Red Rock, Upper Cottonwood, and Lower Cottonwood Creek subwatersheds. The Natural Resources Conservation Service (NRCS) cooperates with TMDL implementation and assists private landowners in establishing best management practices. Urban/suburban sources such as stormwater runoff and septic systems are also being addressed.

The remaining SF Clearwater Rive basin water quality is addressed in the "South Fork Clearwater River Subbasin Assessment and TMDLs (IDEQ et al. 2003, Public Comment Draft-May 2003), developed by IDEQ, the Nez Perce Tribe, EPA, and the South Fork Clearwater River Watershed Advisory Group (WAG). Pollutant sources in the basin derive from both point (WWTPs, suction dredge mining, AFOs, and stormwater runoff) and nonpoint sources (forestry, grazing, agriculture, mining, county and forest roads, and stormwater runoff). The draft assessment indicates sediment is a major concern in the basin, with sediment loadings from agricultural and grazing areas as the primary pollutant sources. Therefore, a sediment TMDL was developed for Threemile and Butcher Creeks (primary agricultural areas in the basin). Additionally, a sediment TMDL was developed for the SF Clearwater River, with four control points from Harpster to above Crooked River. These control points were set with the goal of directing land managers to reduce sediment at appropriate locations in the upper basin, where sand-sized material from human activities affects salmonid spawning. Temperature in the subbasin is a concern, and all water bodies will be included in the temperature TMDL even though not all are listed water bodies. Effective shade and canopy closure will be surrogate targets for temperature improvements associated with the TMDL targets. Bacteria were found to impact beneficial uses (Table 15) on Threemile Creek but not on Butcher Creek (delisting for bacteria is recommended for Butcher Creek), so a bacteria TMDL was developed for Threemile Creek only. Nutrient levels in Threemile Creek substantially exceeded EPA's regional guidance for both phosphorus and nitrogen; therefore a nutrient and a dissolved oxygen TMDL were also developed for Threemile Creek. An assessment of Lucas Lake indicates that sediment and metals are not impairing beneficial uses, so TMDL development was not needed for the lake and presumably the WAG will recommend delisting for sediment (IDEQ et al. 2003, Appendix P). The implementation plan is currently under development, and should be completed in 2004

Table 15. South Fork Clearwater River and tributary segments deemed to be water quality limited (IDEQ 1998, IDEQ et al. 2000). Forty-one segments previously listed within the watershed were removed from the 1996 303(d) List.

Stream Segment	Pollutants of Concern	Stream Miles
Cottonwood Creek- Headwaters to South ForkCR	BACTERIA, NUTRIENTS, SEDIMENT, TEMPERATURE, DISSOLVED OXYGEN, AMMONIA, HABITAT	31.2
Stockney Creek – Headwaters to Cottonwood Creek	SEDIMENT, BACTERIA	12.0
Red Rock Creek - Headwaters to Cottonwood Creek	SEDIMENT	11.0
SF Clearwater River Cottonwood Creek – Headwaters to Cottonwood Creek	HABITAT, BACTERIA, NUTRIENTS, TEMPERATURE	7.0
Shebang Creek – Headwaters to Cottonwood Creek	UNKNOWN	14.6
Long Haul Creek – Headwaters to SF Cottonwood	UNKNOWN	1.6
Threemile Creek- Headwaters to SFCR	NUTRIENTS, SEDIMENT, TEMPERATURE, BACTERIA, DISSOLVED OXYGEN, FLOW ALTERATION, HABITAT, AMMONIA	49.8
Butcher Creek – Headwaters to SFCR	DISSOLVED OXYGEN, TEMPERATURE, HABITAT, SEDIMENT, BACTERIA, FLOW ALTERATION	18.9
Newsome Creek – Beaver Creek to mouth	SEDIMENT	6.9
Cougar Creek – Headwaters to SFCR	SEDIMENT	6.4
Beaver Creek – Headwaters to Newsome Creek	SEDIMENT	5.0
Buffalo Gulch – Headwaters to mouth	SEDIMENT	6.5
Dawson Creek – Headwaters to mouth	SEDIMENT	2.3
Nugget Creek – Headwaters to Newsome Creek	SEDIMENT	2.7
Sing Lee Creek- Headwaters to Newsome Creek	SEDIMENT	3.1
SFCR- Red River to Clearwater River	SEDIMENT, TEMPERATURE, HABITAT	63.8
Little Elk Creek- Headwaters to Big Elk Creek	TEMPERATURE	9.2
Big Elk Creek- Headwaters to Elk Creek	TEMPERATURE	9.6
Lucas Lake	SEDIMENT	0.00

Surface Water Quality Summary

Predominant land use in the Cottonwood Creek drainage is agriculture. The Beneficial Use Reconnaissance Program (BURP) conducted in 1995-96 indicated beneficial uses were not fully supported in Cottonwood Creek or its tributaries. Low flows and high temperatures were problematic, as were lack of riparian vegetation and degraded streambanks. Additionally, sediment delivery to the river and streams was impacting aquatic habitat. The ISWCD initiated a SAWQP to address these priority problems (IDEQ et al. 2000).

Of those streams evaluated as part of the BURP assessment for the remainder of the South Fork Clearwater River basin (excluding Cottonwood Creek drainage), only upper Cougar Creek showed full support of beneficial uses. Five WWTPs located within the basin include Grangeville, Kooskia, Elk City, Stites, and Red River Ranger Station. Sediment and temperature are pervasive problems throughout the basin, while nutrients and bacteria impact only one segment (IDEQ et al. 2003). South Fork Clearwater River is designated by IDEQ as a Special Resource Water from Red River to the Clearwater River. Stream segments or water bodies designated as Special Resource Waters need intense protection to preserve outstanding or unique characteristics or to maintain current beneficial uses, and are protected from additional point source contributions (IDAPA 58.01.02.002.96).

Cottonwood, South Fork Cottonwood, and Threemile Creeks have nutrients listed as impacting beneficial uses. Nutrients are problematic in the Cottonwood Creek drainage, especially nitrates. Cottonwood Creek and tributaries drain the area north of Grangeville, which has documented nitrate contamination problems (ISWCD 2001, IDEQ 2002, Neely 2002). Severe nitrate levels were found in all tributaries of this drainage during spring runoff of 2001, thought to be a result of fall application of anhydrous ammonia (fertilizer)(Myler 2002). According to Myler (2002), much of the phosphorus in surface waters of the Cottonwood Creek drainage is correlated with sediment. The WWTP appears to be the largest contributor to nitrogen and phosphorus loads on Threemile Creek, although non-point sources also contribute a considerable proportion

Erosion and sediment from land use practices is a major problem throughout the entire basin. Thirteen segments list sediment as a pollutant impacting beneficial uses. Mining operations that dredged the South Fork Clearwater River and tributaries drastically altered channel configuration and riparian habitat. These mines sent large amounts of sediment into the South Fork Clearwater River, increasing sediment deposition, bedload, and instability of the system. Most sediment within the upper basin moves in conjunction with 5-year return (or greater) storm events, while mass failures are generally a result of 15-year return (or greater) storms. The largest nonpoint source for sediment in the upper South Fork Clearwater River basin is agricultural lands in Threemile, Butcher, Sally Ann, and Rabbit Creek drainages. The second largest source is erosion resulting from livestock grazing and roads. Red River, Crooked River, Newsome Creek, and American River are heavily impacted by mining, logging, forest roads and grazing. Within the Cottonwood Creek drainage, sediment problems are associated with roads, cropland (37% classified highly erodible), and eroding streambanks from livestock use. Most erosion occurs in winter and during high intensity spring and summer storms (ISWCD 2001).

Table 16. Designated (or existing) beneficial uses for the South Fork Clearwater River and tributary segments listed in the 1998 303(d) list (IDEQ et al 2001).

River/Stream Segment	Designated Beneficial Uses
Cottonwood Creek- Headwaters to SFCR	Coldwater Biota Secondary Contact Recreation Salmonid Spawning Agricultural Water Supply
Stockney Creek – Headwaters to Cottonwood Creek	Undesignated[1]
Red Rock Creek - Headwaters to Cottonwood Creek	Undesignated[1]
SF Clearwater River Cottonwood Creek – Headwaters to Cottonwood Creek	Undesignated[1]
Shebang Creek – Headwaters to Cottonwood Creek	Undesignated[1]
Long Haul Creek – Headwaters to SF Cottonwood	Undesignated[1]
Threemile Creek – Headwaters to the SF Clearwater River	Coldwater Biota Secondary Contact Recreation Salmonid Spawning
Butcher Creek– Headwaters to the SR Clearwater River	Coldwater Biota Secondary Contact Recreation Salmonid Spawning
Newsome Creek – Beaver Creek to SF Clearwater River	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Beaver Creek – Headwaters to Newsome Creek	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Buffalo Gulch – Headwaters to American River	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Dawson Creek – Headwaters to Red River	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Nugget Creek – Headwaters to Newsome Creek	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Sing Lee Creek – Headwaters to Newsome Creek	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
SF Clearwater River– Red River to Clearwater River	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning SPECIAL RESOURCE WATER

Cougar Creek- Headwaters to the SF Clearwater River	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Little Elk Creek- Headwaters to Big Elk Creek	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Big Elk Creek- Headwaters to Elk Creek	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning
Lucas Lake	Coldwater Biota Primary Contact Recreation Secondary Contact Recreation Salmonid Spawning

[1] Undesignated water bodies are presumed to support cold-water biota and primary or secondary contact recreation unless IDEQ determines otherwise (IDAPA 58.01.02.140) (IDEQ 2001).

While only seven segments have been listed for temperature on the 303(d) list, the subbasin assessments within the South Fork Clearwater River basin indicates water temperature is a basin-wide problem. Stream channelization, lack of riparian cover, and altered flow regimes are contributing factors to the temperature problem, resulting in wide, shallow channels that increases the river's ability to absorb heat (IDEQ et al. 2000, 2003). Prolonged warming occurs in the basin from late spring into fall, with maximum temperatures in June through August. (IDEQ et al. 2003). Temperatures in the upper basin are generally stable, while lower-end South Fork Clearwater River temperatures show a dramatic increase and greater diurnal fluctuations. Temperature criteria exceedances have been noted on a number of tributaries within the upper basin as well. The EPA issued new regional water temperature guidance in May 2003, and the South Fork Clearwater River is the first TMDL developed in Idaho to utilize the natural background criteria of the guidance to determine the temperature TMDL.

Bacteria and other pathogens are considered problems in surface waters when levels of either are high enough to create human health problems in rivers or streams used for recreational activity. Bacteria exceedances for primary and secondary recreation have been observed at all sampling locations performed by SAWQP (ISWCD 2001) in the Cottonwood Creek drainage, with May and June occurrences primarily attributed to cattle (Myler 2002). Significant reductions will be required (23-88%) to meet the bacteria TMDL, where sources include hog/dairy/beef operations and failing human septic systems (IDEQ et al. 2000). Threemile Creek in the upper basin is the only segment with observed bacteria exceedances. Likely pathogen sources include: livestock, AFOs, wildlife, failing septic systems, and storm water runoff (IDEQ et al. 2003). (For further information on water quality standards, policies and procedures please see http://www2.state.id.us/adm/adminrules/rules/idapa58/0102.pdf.)

Aquatic Biology and Habitat Concerns

The TMDL process does not address all factors important to the quality of water and the aquatic system. Flow alteration, riparian vegetation, and instream habitat are outside the scope of the TMDL process, but still have critical impact on water quality, the health of the aquatic system, and the community structure. An evaluation of the ecological components provides further information on the man-made impacts to the system.

Biotic Integrity and Instream Habitat

Several assessments have examined biotic integrity (health and sustainability of the biological community) within the South Fork Clearwater River basin (BLM (IDEQ et al. 2000), USFS (1997), IDEQ-BURP (IDEQ et al. 2000, 2002), SAWQP (ISWCD 2001)). These assessments all indicate that the riverine habitat is impacted negatively by a variety of land and water uses. Extreme alterations to channel morphology due to placer mining (IDEQ et al. 2002) have occurred in the upper basin. Four major tributaries (Red River, Crooked River, American River, and Newsome Creek) as well as the upper mainstem have extensive dredge mining alterations. Improvements to habitat cannot be obtained unless functional channels are reestablished in some way (Petts and Catlow 1996, Gordon et al. 1992). The South Fork Clearwater River is impacted below the national forest boundary by many activities, and is wider, shallower and generally lacking in quality pool components (USFS 1997, IDEQ et al. 2000, Appendix C and D). Woody debris is missing in the lower end of the basin (Cottonwood Creek drainage), although it once provided a critical function. Where pools do exist, quality is low due to this lack of woody debris or instream cover. Little offstream habitat exists to provide refuge for fish (IDEQ et al. 2000, Appendix D).

Cobble embededness occurs when fine sands and silts are deposited over larger substrate particles (gravel, cobble, boulder). Increased cobble embeddedness within the river and many tributaries has adversely affected salmonid spawning, juvenile survival, and density and diversity of macroinvertebrates (IDEQ et al. 2000, Appendix D). Benthic macroinvertebrates integrate the effects of upstream land and water uses in a basin over the long term, and therefore are important indices of water quality. While the biotic integrity of the South Fork Clearwater River is of intermediate quality overall (Maret et al. 2001), many streams within the basin are degraded.

The combination of resident and migratory life histories in fish is a strategy for disturbance-based systems such as the South Fork Clearwater River basin. The intermixing of local subpopulations with fluvial or migratory populations (metapopulations) is also an adaptive strategy (USFS 1997). Natural disturbance cycles/characteristics have been altered and/or replaced by man-made disturbances, causing problems for fish and wildlife. Fish populations are widely distributed, but they are likely quite different than historical distributions. Fish abundance appears to have declined significantly. Viability of the fisheries is at risk due to in-basin and downstream factors that limit flexibility and alter life history strategies (USFS 1997). While much of the native ecosystem has been altered in some way within the basin, there are still core areas available for rebuilding and maintaining native aquatic systems. Significant areas still exist where upland watershed, riparian and stream conditions are relatively intact. For instance upper Johns and Tenmile Creeks (highlands of the Gospel-Hump) have had little mining influence and are probably the best habitat for many salmonid species (IDEQ et al. 2003).

Riparian Habitat

The loss of riparian habitat due to land use has been problematic within the South Fork Clearwater River basin for more than 50 years. The integrity of riparian vegetation and its extent along rivers has been changed and fragmented by forest conversion and streamside disturbance (USFS 1997). In the upper basin, upper and lower Canyon Creek, Meadow Creek, Cougar Creek, Newsome Creek, lower American River, Red River, lower Crooked River, and lower Mill Creek all have high to very high departures from historic riparian condition, many of which represent the most valuable aquatic habitats in the subbasin (USFS 1997). Many of the tributaries to Cottonwood Creek lack plant diversity and have lost important shrub communities and other woody plant species. These communities are important in providing shade, wildlife habitat, and material for instream cover components. Although riparian habitat is not formally addressed in

the TMDL process, effective shade and canopy closure will be used as surrogate targets for temperature improvements associated with the TMDL targets.

Flow Alteration

Land vegetative cover and subsequent management have resulted in dramatic changes to runoff and peak discharge from the watershed during storm events in the lower basin. In the upper basin, forest practices such as harvesting and fire suppression, have altered the disturbance cycle and therefore the resulting hydrology as well. Flow changes include higher and greater volume peaks due to land use. ISWCD (2001) estimates that peak flows are 60% greater than under historic conditions in the lower basin. Higher peak flows may impact stream channels by widening and scouring, and providing energy for transporting and moving large substrate downstream. Less infiltration and higher runoff also reduces the water storage component and hence summer flows. This affects availability of instream and side channel habitat for fish and increases stream temperatures (IDEQ et al. 2000). Although not addressed by the TMDL, the ISWCD's SAWQP will be implementing BMPs to mitigate changed hydrology due to land use. The Nez Perce NF also has plans to change forest management practices (e.g., prescribed burning) to restore more natural disturbance cycles and characteristics, as well as improvements to restore channel function.

Ground Water Vulnerability and Contamination Pathways

The primary land uses/types in the South Fork Clearwater River basin are agriculture, rangeland, and forest. Rangeland and dry-land agriculture are located primarily in the western portion of the basin, and forested lands dominate the eastern areas. There is a strong relationship between land use activities and ground water quality (GWQC 1996). Water management practices as well as land uses, in combination with the hydrogeologic conditions, can increase the potential for ground water quality degradation, threatening ground water beneficial uses. Studies of the Camas Prairie in the basin (Bentz 1998, Neely 2002, Parliman 2002) have shown that the aquifer appears to be vulnerable to nitrate contamination, and greatest nitrate concentrations occurred adjacent to cultivated fields (Bentz 1998). A large percentage of septic system failures in certain areas have also been estimated by the local Health Department (Cottonwood TMDL 2000). There are areas of declining ground water on the plateau despite limited pumping, and cross contamination is occurring from shallower to deeper aquifers from inappropriate well siting/construction (South Fork Clearwater River Draft TMDL 2002).

Both point (specific source of pollutant, usually localized) and nonpoint (more diffuse, multiple sources, usually widespread) sources of pollutants contribute to ground water quality degradation. Nonpoint sources are often associated with broad land use practices, such as crop production (USGS 1998). Practices such as fertilizer and pesticide application and application of animal waste have the potential to threaten the aquifer. Once degraded, it is difficult to mitigate the effects of ground water pollutants. For this reason, many ground water quality programs emphasize the need for preventive practices.

Monitoring

Within the South Fork Clearwater River basin, IDWR monitors only 12 wells. Reports (Neely and Crockett 1998, Neely 2001) characterizing regional and county ground water quality are based on well sampling conducted from 1991 to 1999.

Currently identified ground water quality problem areas or potential problem areas have been established in the basin based on past monitoring activities (Map 2). Results of ground water monitoring (Neely 2002, from IDWR Ground water Quality database) are summarized in Table 16. There are few ground water contaminants indicated from IDWR ground water monitoring wells (Neely 2002). Iron and radioactivity may be constituents of concern detected in ground water, but they are most likely from natural causes or conditions.

The Camas Prairie region has been designated a nitrate priority area (fifth priority in the state) by IDEQ (2002)(Map 2). More than half of the wells in the Camas Prairie have had nitrate levels exceeding 5 mg/L (IDEQ 2002). Examination of data from 1990-99 revealed wells ranging in values from 0 to 80 mg/L, with a mean of 5.1 mg/L for the entire Camas Prairie. Nitrate concentration values greater that 2 mg/l are considered impacted by land use activities As of 2000, seven IDWR wells have been sampled for nitrates in the South Fork Clearwater River basin, and four of these wells had mean nitrate levels greater than 2 mg/L. Based on these results, and monitoring results by IDEQ (Bentz 1998), ISDA initiated the Southern Clearwater Plateau Volcanic Aquifer regional monitoring project in 2001. First-year results showed that 22% of wells in the South Fork Clearwater River basin had nitrate levels between 2 and 5 mg/L, and 11% of wells had values exceeding the MCL (data from Bahr and Carlson 2002). Bentz (1998) found that nitrate tended to be highest adjacent to cultivated lands with shallow wells. The long-term trends are unclear, but short-term trends in nitrate levels appear to be increasing in the Camas Prairie region (Parliman 2002).

IDEQ maintains a list of known leaking underground storage tanks (LUSTs). Five are located in the basin, and all have completed required clean-up procedures. Initial sampling has shown that localized pesticide/herbicide levels could be a concern in the basin, and further monitoring will be done by ISDA (2002). ISDA is in the process of developing the State Pesticide Management Plan to address water quality concerns regarding pesticide, fungicide, and herbicide use and disposal.

Table 17. Inorganic ground water quality constituents found in the South Fork Clearwater River basin aquifers from 1990 to 1999 (IDWR ground water quality database). Well depths range from 58 to 430 feet.

Constituent	Primary MCL	Secondary MCL	Minimum Value	Median Value	Maximum Value	Potential Health Ri (from EPA)
Chloride (mg/L)[1]	---	250	0.1	3.78	21	Aesthetic: salty tast
Fluoride (mg/L)[3]	4.0	2.0	0.20	0.53	0.8	Bone disease, tooth
Iron (mg/L)[1]	---	0.3	0.005	0.201	0.490	Aesthetic: metallic rusty color of water
Nitrate (mg/L)	10	---	0.24	2.51	6.5	Serious illness in y
Sulfate (mg/L)[1]	---	250	2.8	12.6	48	Aesthetic: salty tast
Alpha (pCi/L)	15 pCi/L	---	0	1.19	4.1	Increased risk of ca
Beta (pCi/L)	50 pCi/L[2]	---	0.6	3.21	7.7	Increased risk of ca

Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million.

Notes:

[1] No primary MCL. Value presented is the Secondary MCL, which is a guideline (non-enforceable) to regulate contaminants for cosmetic or aesthetic effects.

[2] A public water system is considered to be in compliance if the gross beta does not exceed 50pCi/L. The actual Primary MCL is 4 millirems per year.

[3] Fluoride has both a Primary MCL and Secondary MCL.

The U.S. Environmental Protection Agency (EPA) has established National Primary Drinking Water Regulations that set mandatory water quality standards for drinking water contaminants. These are enforceable standards called "maximum contaminant levels" or "MCLs", which are established to protect the public against consumption of drinking water contaminants that present a risk to human health. An MCL is the maximum allowable amount of a contaminant in drinking water which is delivered to the consumer.

In addition, EPA has established National Secondary Drinking Water Regulations that set non-mandatory water quality standards for 15 contaminants. EPA does not enforce these "secondary maximum contaminant levels" or "SMCLs." They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the SMCL.

5.7 Energy Supply and Conservation

Electrical energy to the South Fork Clearwater River basin is provided by AVISTA (formerly Washington Water Power Company) and by a local cooperative, Idaho County Light and Power Inc. There are no commercial hydropower facilities in the basin (Crockett, IDWR, 2002).

Wood is a popular choice for heating because of the convenience of the basin's private and public forest properties. The low efficiency of wood as

a fuel is offset by its low cost. It is not known if supply and distribution limitations constrain wood as a source to meet future energy needs in the basin.

There is some use of propane for heating fuel. Idaho County Light and Power Inc. provides propane. Propane prices can exhibit price spikes that are greater in intensity than would be expected from normal supply and demand influences (Energy Information Administration n.d.). Price increases are often seen in the winter, as demand increases and refinement production remains constant.

The gasoline supply is adequate in the basin. Retail outlets are located in most cities including Grangeville, Cottonwood, Elk City and Kooskia. As with other fuel sources, the basin remains vulnerable to stormy weather and interruptions in the surface transportation system. Natural gas, carried via pipelines to the end consumer, is not available in the South Fork Clearwater River basin.

Conservation programs designed to increase efficiencies in energy use are expected to play major roles in meeting future energy requirements in the short-run (Idaho Power Company 2001). The Energy Division of IDWR provides information, technical assistance, and financial support to promote cost-effective conservation and the use of energy-efficient resources. The Northwest Energy Code and locally adopted building codes are examples of programs that support modern conservation standards for new building construction, and are usually administered by local governments. Existing buildings are eligible for energy conservation upgrading through several programs sponsored by state and federal agencies and the private utilities industries, including the Building Commissioning program, Gem Star Home Energy Rating System, Super Good Cents and Natural Choice (Eklund 1997).

The Agricultural Efficiency Program was initiated because of agriculture's significance within Idaho, both as an economic base and a highly consumptive energy and water user. The program is designed to assist Idaho's irrigators in reducing energy use and irrigation costs by controlling and managing water. The program includes Scientific Irrigation Scheduling, Pump Efficiency Testing, and other technical assistance. The IDWR Energy Division has a Low Interest Agricultural Loan program to repair and replace irrigation systems, improve efficiencies of irrigation systems, and to improve efficiencies of other farm facilities such as feed mills, dairies, poultry, greenhouses and commodity storage buildings.

The IDWR Energy Division provides technical information and assistance in the use of solar, wind power, geothermal, hydropower, and biomass energy sources. The Energy Division provides low interest loans to finance the development of Energy Conservation and Energy Generation projects that utilize renewable energy resources. The loan programs cover residential, agricultural, governmental, schools, hospitals, health care, commercial and industrial facilities.

5.8 Potential Hydropower

Numerous hydropower sites have been studied in the South Fork Clearwater Basin by the U. S. Army Corps of Engineers, the U. S. Water and Power Resources Service(Bureau of Reclamation), and the Idaho Water and Energy Resources Research Institute(Idaho Water Resources Research Institute), University of Idaho. The most feasible sites studied are listed in *Potential Hydroelectric Energy Resources of Idaho*, Idaho Department of Water Resources, June, 1981(Warnick, Filler, Vance). These sites are shown in Table 17 and on Map 8. It should be

noted that the installed capacities (MW) listed cannot be summed for the total power potential in the basin as studied at the time. These studies indicate that about 135 – 315 megawatts of power could have been developed for the economic, environmental and other conditions of that time. New studies conducted would most likely develop different installed capacities due to changed economic conditions, NEPA and ESA requirements, water quality, fisheries, social, recreation and other concerns and requirements.

Table 18. Potential hydroelectric power development.

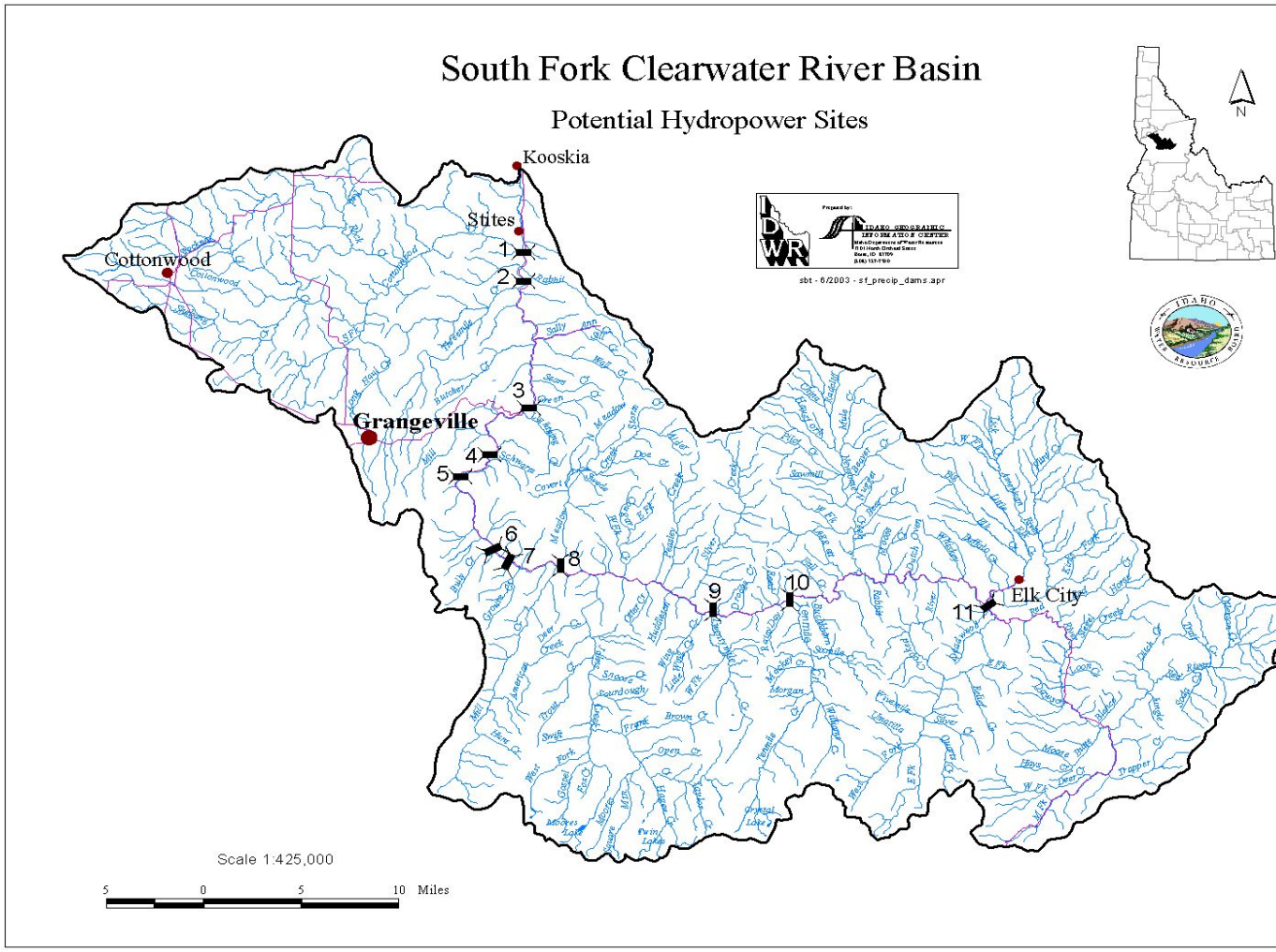
Powerplant Site	Map Site No.	Stream Name	Head (ft)	Installed Capacity (MW)
Bully Creek	6	S. F. Clearwater	30	2.4
Elk City	10	S. F. Clearwater	580	3.9
Grangeville Site	4	S. F. Clearwater	292	16.3
Johns Creek 1	3	S. F. Clearwater	785	38.3
Johns Creek 2	3	S. F. Clearwater	66	4.7
Lower Golden	9	S. F. Clearwater	66	2.9
Meadow Creek 1	8	S. F. Clearwater	810	2.3
Meadow Creek 2	8	S. F. Clearwater	66	1.6
Mount Idaho	5	S. F. Clearwater	50	4.1
Newsome Creek	10	S. F. Clearwater	787	20.7
Newsome Creek 1	10	S. F. Clearwater	1040	75.8
Newsome Creek 2	10	S. F. Clearwater	66	2.9
Red Horse 1	11	Red River	300	0.8
Red Horse 2	11	Red River	66	1.3
Sheep Bridge	7	S. F. Clearwater	300	15.5
Silver Creek	9	S. F. Clearwater	295	10.5
Silver Creek 1	9	S. F. Clearwater	430	12.5
Silver Creek 2	9	S. F. Clearwater	66	3.5
SF Clearwater River1	2	S. F. Clearwater	355	64
SF Clearwater River2	2	S. F. Clearwater	66	5.5
SF Clearwater River Site	2	S. F. Clearwater	355	21.5
Tenmile Creek 1	9	S. F. Clearwater	420	4.2
Tenmile Creek 2	9	S. F. Clearwater	66	3.2
Three Mile Creek	1	S. F. Clearwater	155	9.6
Three Mile Creek 1	1	S. F. Clearwater	600	6.4
Three Mile Creek 2	1	S. F. Clearwater	66	3.3
Upper Golden	9	S. F. Clearwater	66	2.9

While there are no specific State of Idaho energy licensing requirements for hydropower projects, all hydropower projects must have a water right issued by IDWR. At the present time, there are no hydropower plants in the basin that have received water right licenses from IDWR (Sherman, IDWR 2002). The Idaho State Water Plan (December 1996), Section 4D – Hydropower Licensing, states that hydropower water rights may be limited to a specific term and subordinated to upstream depletionary uses[Idaho Code, 42-203B(6) and (7)]. Water rights for power purposes may also be defined by agreement as unsubordinated to an established minimum flow [Idaho Code, 42-203B(2)]. It is the policy of the State of Idaho to keep hydropower development from precluding the future development of water for higher and better uses. Article XV, §3 of the Idaho Constitution, states in part: *"the right to divert and appropriate the unappropriated waters of any natural stream to beneficial uses, shall never be denied, except that the state may regulate and limit the use thereof for power purposes."*

Federal hydropower development is authorized by Congress, and non-federal development is authorized and licensed by the Federal Energy Regulatory Commission (FERC). In certain cases, non-federal hydropower projects may qualify for an exemption from licensing by the FERC. If no federal lands are involved, small hydropower projects of 5 megawatts or less, and projects built on existing water conduits may be exempt if they meet all FERC regulations pertaining to these exemptions. The federal government, in the hydropower licensing process, must recognize water rights and other constraints on water use established through state law. The Idaho State Water Plan, Section 4E – Hydropower Siting, states that specific hydropower siting issues are addressed in the Idaho Water Resource Board's comprehensive river basin plans. It further states that the Federal Energy Regulatory Commission must consider State comprehensive plans in making hydropower siting decisions. As a general policy, the Idaho Water Resource Board believes that energy conservation and efficiency improvements are the most desirable methods to provide for additional power requirements.

Although the SF Clearwater basin is abundant in water flows and elevation drop (head), changes to the natural hydrologic regime by impounding or diverting water can affect fish, wildlife, and vegetation resources in numerous ways. The potential benefits of any new hydroelectric project development must be weighed against the potential negative impacts to the basin resources.

This comprehensive river basin plan provides for consideration of minimum stream flows and designates the South Fork Clearwater River mainstem (63.8 miles), as "Recreational**"** thus preventing hydropower development without IWRB approval. The potential hydropower sites that have been studied are located on the mainstem. Other hydropower sites on the tributary streams of the basin could be studied in the future. Many of the tributary streams are also recommended for consideration of minimum flows and protected status. This plan addresses potential hydropower development in the Recommendations and Designated Rivers Sections.



Map 8. Potential hydropower sites.

5.9 Other Resources

5.9.1 Fish Species Listed Under the Federal Endangered Species Act

Fall chinook (*Oncorhynchus tshawytscha*)

Fall chinook are listed as threatened under the Endangered Species Act. All fall chinook above Lower Granite Dam are considered one Ecologically Significant Unit (ESU) (Waples et al. 1991).

From 1911 to 1963 a Washington Water Power Dam, Harpster Dam, was located on the South Fork Clearwater River upstream from its confluence with the Middle Fork of the Clearwater River. The structure only had fish passage facilities from 1935 to 1949 and the effectiveness of the passage system was not known (USFS 2000). It likely greatly impacted or eliminated some anadromous runs of salmon and steelhead in the South Fork Clearwater River basin. It is believed that all indigenous spring chinook salmon were eliminated by the construction of Lewiston Dam in 1927 (USFS 1998; USFS 1999).

Both dams have been removed but the impacts to fish were severe. Prior to 1900 and the construction of the many dams in the Snake River, fall chinook salmon were widely distributed (Waples et al. 1991). After the removal of the Lewiston and Harpster dams, anadromous fish were outplanted in the basin and naturalized runs were established with varying success.

Table 19. Fish listed as Threatened, Endangered, Sensitive, or Species of Special Concern in the South Fork Clearwater River basin.

Fish Species	Life History	Status
Fall chinook salmon (*Oncorhynchus tshawytscha*)	Anadromous	Threatened[1]
Steelhead (*Onchorhynchus mykiss*)	Anadromous	Threatened[1]
Bull trout (*Salvelinus confluentus*)	Resident and Fluvial	Threatened[1], Sensitive Species[2]
Pacific lamprey (*Lampetra tridentata*)	Anadromous	Endangered[3]
Spring chinook salmon (*Oncorhynchus tshawytscha*)	Anadromous	Sensitive[2], Species of Special Concern[3]
Westslope cutthroat trout (*Onchorhynchus clarki*)	Resident and Fluvial	Sensitive[2], Species of Special Concern[3]
Redband rainbow trout *Onchorhynchus mykiss*)	Sensitive	Sensitive[2], Species of Special Concern[3]

[1] ESA federal listing
[2.] Forest Service Region 1 listing
[3.] Idaho Department of Fish and Game state listing

Reintroduction of fall chinook in the basin has not been as successful as the spring chinook program (IDFG 2001). Populations in the basin are extremely depressed. Two fall chinook redds were observed in the South Fork Clearwater River in 1999 and one was noted in 2000 (WSU 2001). Some fall chinook juvenile rearing likely occurs in the lower South Fork Clearwater River(USFS 2000).

Steelhead Trout (*Onchorhynchus mykiss*)

The anadromous steelhead trout including those in the South Fork Clearwater River were listed as threatened under the Endangered Species Act in 1997. Naturally produced South Fork Clearwater River steelhead are considered part of the Snake River ESU.

The South Fork Clearwater River basin has a high capacity to produce steelhead (USFS 1998). In general, the basin contains a significant amount of habitat with high to very high potential to support native species (USFS 1999). Optimum steelhead spawning habitat can be characterized by temperatures of 50^{o}-60^{o}F, water depths of 1 to 2 ft., and gravels of 1 to 3 in. High quality habitat for steelhead is found in lower Crooked River, Newsome Creek, Johns Creek and Tenmile Creek. Sections of Crooked River and Newsome Creek have been impacted by mining and human activities. Mill Creek, Meadow Creek, Red River and the American River have been degraded moderately to severely and some limited spawning occurs in the mainstem South Fork Clearwater River.

Adults returning to the South Fork Clearwater River are considered "B" run steelhead. "B" refers to the time of crossing over Bonneville Dam. "B" run fish run later than " A" run fish. Most "B' run fish spend two years in the ocean and weigh 12 to 13 lbs when they return to the Clearwater River basin.

Bull Trout (*Salvelinus confluentus*)

The bull trout, a charr, was listed as threatened under the Endangered Species Act in 1998. The listing required that agencies administer active management plans to protect the species and its habitat. Critical habitat for bull trout has been proposed in Idaho in the Clearwater and Salmon River basins (USFWS 2003).

Bull trout have specific habitat requirements. Water temperatures above 59^{0} F limit bull trout distribution (Pratt 1984). Spawning temperatures range from 40^{o} to 46^{o}F, lower than most other Idaho trout. Lack of migration corridors, substrate, stream flows and channel stability can also impact bull trout distribution (Thurow 1997; Fraley and Shepard 1989).

Watson and Hillman (1997) state that management and protection of bull trout needs to be site specific. The IDFG, the USFS and the BLM sponsored an ongoing study in the South Fork Clearwater River basin starting in 1993, to learn more about native bull trout and its habitat (IDFG 2001). South Fork Clearwater River basin is a key watershed for bull trout (Idaho 1996).

Movement of bull trout among the South Fork Clearwater, Middle Fork Clearwater, Lochsa and Selway Rivers has not been documented but is feasible (USFS 1999). Movement of fluvial bull trout in the Blackfoot River in Montana migrated up to 80 miles (Swanberg 1997). The distance from the upper tributaries in the South Fork Clearwater River to the confluence of the Middle Fork Clearwater River is about 50 miles. It is possible that some migratory bull trout were restricted in movements during the period that Harpster Dam was in place on the South Fork Clearwater River.

5.9.2 Sensitive Species

Spring chinook Salmon (*Oncorhynchus tshawytscha*)

Spring chinook salmon enter the Columbia River and begin spawning migrations during April and May. Snake River spring/summer chinook were listed as a threatened species under the federal Endangered Species Act in 1992 (Table 19). Spring chinook in the Snake River are considered an ESU, but the South Fork Clearwater River chinook are not considered part of the ESU. It is believed that the indigenous spring chinook salmon in the Clearwater basin were eliminated by the construction of Lewiston Dam in 1927 (USFS 1998). Reintroduction of spring chinook has resulted in a naturalized population , but South Fork Clearwater River chinook are not listed because of the genetic uncertainty of the stock (IDFG 2001).

Nutrient flow of carbon, nitrogen, and phosphorus brought upstream by spawning salmon is significant in determining the overall productivity of both watersheds and salmon runs (Willson and Halupka 1995). Trees and shrubs near spawning streams derive approximately 22 to 24% of their nitrogen from spawning salmon as indicated by isotopic analyses (Helfield and Naiman 1998).

The South Fork Clearwater River and some tributaries provide travelways, spawning, and rearing habitat for the chinook. The most important habitat in the basin is found in the Red River, Crooked River and American River. Redd counts in the South Fork Clearwater River basin have been highly variable (Table 19). The lowest recorded number of redds was in 1999.

To reestablish runs of spring Chinook in Newsome Creek, the Nez Perce Tribe operates the Newsome Creek Satellite Acclimation Facility. Approximately 75,000 spring Chinook fingerlings from the Nez Perce Tribal Hatchery are transferred to the facility in May and are held until release in October.

Table 20. South Fork Clearwater River spring chinook salmon traditional trend aerial redd counts, 1966-2001.

Year	Number[1]	Year	Number[1]
1974	17	1988	110
1975	59	1989	53
1976	33	1990	78
1977	88	1991	6
1978	77	1992	98
1979	27	1993	209
1980	46	1994	17
1981	75	1995	6
1982	112	1996	44
1983	113	1997	242
1984	87	1998	64
1985	130	1999	5
1986	109	2000	154
1987	143	2001	

1 South Fork Clearwater River Clearwater counts in Red, American, Crooked Rivers and Newsome Creek;
Newsome Ck had 280 excess adult outplants during 1997 and 362 adults, 125 jacks excess Adult outplants during 2000.

Westslope cutthroat trout (*Onchorhynchus clarki lewisi*)

Westslope cutthroat trout are listed as Sensitive by the USFS and a Species of Special Concern by the IDFG (Table). Westslope cutthroat trout historically were the dominant trout in streams of central and northern Idaho (Behnke and Wallace 1986).

Westslope cutthroat in the South Fork Clearwater River basin are an important metapopulation in the Clearwater River basin (USFS 1998). Strong populations are found in Johns Creek, Tenmile Creek, Crooked River, Meadow Creek and Mill Creek (USFS 2000). Populations in the basin are generally small fluvial fish (USFS 1998). Poor habitat in the lower reaches of streams in the basin probably limits cutthroat trout dispersion.

Redband Rainbow Trout (*Onchorhynchus mykiss*)

Redband trout are considered by the USFS to be a Sensitive Species (USFS 1998). They are a listed as a Species of Concern by Idaho (IDFG 2001). Redband trout are a non-anadromous form of *Onchorhynchus mykiss* and distribution in the western U.S. closely matches steelhead (Behnke 1992).

Redband populations are found in areas of more extreme conditions than other rainbow trout (IDFG 2001). The South Fork Clearwater River basin has good habitat for redband/steelhead in numerous areas. It is not known if redband move from the mainstem South Fork Clearwater River into the lower reaches of the tributaries when the water temperature increases in the summer.

Pacific Lamprey (*Lampetra tridentata*)

The Pacific lamprey is listed as Endangered by Idaho (IDFG 2001). Adult returns of lamprey to the Snake River from 1995-1999 were ten magnitudes less than they were in the 1960's (Cochnauer and Claire 2000). Historically, up to 400,000 lampreys were counted migrating past Bonneville Dam (USFS 1998).

Pacific lampreys are anadromous and face the same migratory threats as South Fork Clearwater River salmon and steelhead (Moser et al. 2002). Logging, stream impoundment, road building, grazing, mining and community development have impacted habitats in the Snake River corridor and the Clearwater River basin. Lampreys can be a large portion of the biomass in streams where they are abundant (Close et al. 2002). They are important in nutrient cycling, nutrient storage and as an important prey item. Lampreys have adapted with their prey (Beamish 1980).

The lamprey is not a game fish and has not been a fishery management priority with most agencies. However, Native American Tribes view the loss of the lamprey as loss of culture, loss of fishing opportunity and they are forced to travel to the lower Columbia tributaries to harvest lampreys (Close et al. 2002).

Cochnauer and Claire (2000) have studied the lamprey in the South Fork Clearwater River basin focusing on distribution, life history and habitat requirements. Lampreys were collected by electrofishing and trapping. Lampreys have been found in Red River and could occur in the American River (USFS 1998; Cochnauer and Claire 2000).

Fish Hatcheries

A federal fish hatchery, managed by the USFWS, is located at Kooskia. Spring/summer chinook salmon are produced here and fall chinook and steelhead have been reared here. IDFG has satellite facilities at Red River, Crooked River and a pond at Red River for anadromous fish

production. The Nez Perce Tribe releases chinook and steelhead in the basin.

Additional Sensitive Species

The South Fork Clearwater River basin is home to many species not on the USFWS threatened or endangered list, but whose populations may be at risk or are considered sensitive by the resource agencies. These species include:

- ***Mammals***: fisher, wolverine, and Townsend's big-eared bat
- ***Birds***: pygmy nuthatch, northern goshawk, great gray owl, barred owl, black-backed woodpecker, white-headed woodpecker, three-toed woodpecker, Lewis woodpecker, mountain quail, flammulated owl
- ***Plants***: broad fruit mariposa, Oregon bluebells, evergreen kittentail

Little is known about the distribution and abundance of most of these species in the basin. However, it is known that white-headed woodpecker, flammulated owl, and northern goshawk numbers are declining in the basin due to the loss of large Ponderosa pine trees.

5.9.3 Wildlife

Wildlife habitats have been identified in studies by various government agencies and observations of the residents and visitors to the basin.

Big Game

Most of the large game mammal populations in the South Fork Clearwater River basin, including whitetail deer, elk, black bear, moose, and mountain lion, are stable or expanding. However, the hunting quota for large bull elk in Unit 15 has been reduced by 25% (Crenshaw 2002).

5.9.3.1 Birds and Mammals Listed Under the Endangered Species Act

Bald Eagle (*Haliaeetus leucocephalus*)

Bald Eagles are listed as Threatened. Originally listed as Endangered on March 11, 1967, they were downlisted to threatened on July 12, 1995. On July 6, 1999, the USFW proposed delisting the bald eagle because data suggest that the species has recovered to levels necessary to maintain a viable population (U.S. Fish and Wildlife Service 2000b). No bald eagles nest within the South Fork Clearwater River basin. Some bald eagles have been seen in the winter along the South Fork Clearwater River and on the Camas Prairie.

The South Fork Clearwater River basin is part of Bald Eagle Recovery Zone 15, which encompasses all of central Idaho. The recovery goal for Zone 15 is to provide secure habitat for at least six bald eagle nesting territories, with long-term occupation of at least four.

Canada Lynx (*Lynx canadensis*)

This species is listed as Threatened, effective April 24, 2000. Lynx have been recorded in the South Fork Clearwater River basin (USFS 1998). Lynx denning habitat is abundant in the upper elevations of the basin. The most suitable lynx habitat is in Johns Creek, American River, Crooked River and Red River.

Gray Wolf (*Canis lupus)*

The population of gray wolves south of Interstate 90 was listed on November 22, 1994, as an "Experimental Population – non-essential." On July 13, 2000, the U.S. Fish and Wildlife published a proposal to reclassify populations of gray wolf. Under this change, Idaho's population south of Interstate 90 would retain Experimental Population designation, and would be

a part of the Western Distinct Population Segment, subject to rules specific to that Distinct Population Segment. Wolves north of Interstate 90 are listed as Endangered.

Grizzly Bear (*Ursus arctos*)

In the early 1800s, grizzly bears were abundant in the Clearwater River basin. Currently, grizzly bears do not occupy any part of the South Fork Clearwater River basin (USFS 1999). The last sighting of a grizzly bear in the basin was in 1956 (USFS 2000). The Bitterroot Grizzly Bear Recovery Area is a few air miles from the South ForkCR. The home range of a grizzly bear can be up to 1,000 miles (Le Franc et al. 1987). If grizzly bears are reintroduced to the Bitteroot Mountains, then it is possible that bears will be sighted occasionally in the basin.

5.10 Recreation

The South Fork Clearwater River basin serves primarily as a local and regional recreational resource. The recreational opportunities occur mostly on USFS, BLM and IDFG lands in the upstream, eastern side of the basin. The western side of the basin is mostly private farmland. There are scattered parcels owned by the BLM, but none of them are managed for recreation.

There is one recreation area on the western side of the basin, Snow Haven Ski Area. It is south of Grangeville and just north of the Nez Perce NF boundary (Idaho County Free Press 2002). The Snow Haven Ski Area has a rope tow, T-bar lift and a day lodge. It is on private land.

On its eastern side, the South Fork Clearwater River and its tributary streams offer a range of recreational opportunities throughout the seasons. There is access through the South Fork Clearwater River basin to three federally designated wilderness areas – the Selway, Frank Church River of No Return and Gospel Hump. There are resorts, such as the Red River Hot Springs; developed camping sites and many places for dispersed camping. The USFS, although it does not have user numbers, reports that recreational use of the Nez Perce NF continues to grow (U.S.D.A. Forest Service 1998).

Extensive mining history, sites of ghost towns and former dredges are some of the tourist attractions in the basin. Travelers can explore the historic Elk City Wagon Road and participate in the annual summer festival honoring the 53-mile route, built in 1894 – 1895, for miners and prospectors to get to the gold fields of Elk City (Idaho County Free Press 2002).

May and June are the months boaters, mostly accomplished kayakers, hit the South ForkCR. Two runs, Golden Canyon and below Bully Creek, are discussed by Amaral (1990). Both runs are described at spring runoff flows. Below 600 cfs, the river becomes constricted and is too rocky for boating. The most difficult conditions, at higher flows, are sought out as one of the premier challenging runs in the state by expert boaters in kayaks, small rafts or catarafts (USFS 1997). There is no power boating on the South ForkCR.

Summer and fall are seasons for camping, fishing, hiking, and exploring the side drainages and back roads. Both roaded and trail recreation opportunities are available throughout the basin. Roaded recreation opportunities are available primarily in the lower elevations, while trail recreation dominates the higher areas. There are many miles of groomed and non-groomed

snowmobile trails in the South Fork Clearwater River basin that provide winter recreational opportunities. Cross-country skiing is popular in the basin. The Nez Perce NF provides most of the recreational opportunities on the eastern side of the basin. Recreational designations and assessments and human use trends are presented in the South Fork Clearwater River Landscape

Assessment, available on the Nez Perce NF website www.fs.fed.us/r1/nezperce. The assessment is updated as information becomes available.

The dramatic increase in off-road vehicle (ORV) use has created a management challenge for the public landowners. Currently, a process is developing to get both USFS regions, the BLM and State of Idaho together to address ORV use (Personal comm., Doman 2002). Few trails are designed specifically for ORVs. People have been driving ORVs in inappropriate places and resource damage is occurring. If all public landowners can work together, as has happened in other states, the management challenges regarding ORV use may be reduced.

In 1997, there was a limited fishery for spring chinook salmon in the South Fork Clearwater River basin: harvest was less than 100 (Horton, IDFG, personal communication 2002). Harvest of chinook in the South Fork Clearwater River basin was estimated at 4,105 in 2001. There was a season for chinook in 2002 from April 20 through August 4 and the limit was two per day and 20 for the season. About 900 chinook were harvested in 2002 (Barrett, IDFG personal communication).

The IDFG conducted a creel survey on the South Fork Clearwater River in 1999 (Cochnauer et al. 1999). Angler effort on the South Fork Clearwater River was estimated at nearly 20,000 hours. Fishing for steelhead was estimated at 14,856 hours (74% of effort). Anglers harvested 2,628 steelhead from the South Fork Clearwater River in 1999. About the same number were harvested in 2000 and 2001. Most of the harvest is in the spring during the months of March and April (Barrett, IDFG personal communication). An estimated 5,898 resident fish were harvested in 1999 including about 3,300 hatchery rainbow/steelhead trout, 2,300 wild rainbow/steelhead trout, 118 brook trout and 88 cutthroat trout.

Not all hatchery chinook released in the basin are marked. The Nez Perce Tribe does not mark sub-yearling chinook of hatchery origin. Therefore, some returning adults of hatchery origin are unmarked and cannot be harvested by anglers.

Lake fishing in this part of the basin is, almost exclusively, for native westslope cutthroat trout in high mountain lakes (Barrett IDFG, personal communication). Brook trout are found in some high mountain lakes in the basin. Brook trout can out-compete cutthroat trout in high mountain lakes, resulting in declines of the native species and a population of stunted brook trout. IDFG has stocked sterile tiger muskie in Rainbow Lake to reduce or eliminate nonnative brook trout. In addition to the westslope cutthroat trout fishing, two ponds along Crooked River are stocked with rainbow trout (Personal comm.. Barret, IDFG).

Fall hunting may attract the most visitors to the basin who are not from the local area. Hunters come from out-of-state in search of big game. The South Fork Clearwater River basin includes Big Game Management Area Unit 15 and a portion of Units 11A and 16. Big game species in the South Fork Clearwater River basin are moose, elk, deer, bear and mountain lion. Unit 15 is a popular whitetail deer hunting areas. Few mule deer are taken in the basin (Personal comm.., Crenshaw 2002). In Unit 15, management objectives for large bull elk were not being met, and harvest goals have been reduced. In 2001, rifle hunters harvested 140 elk in Unit 15. Success

rate was 18%. Rifle deer harvest in Unit 15 was 927 animals with a success rate of 50%.

Bear and mountain lion hunting have been closed on the north side of the South Fork Clearwater River for three years while a fawn mortality study is being conducted. Hunting for these species is still open on the south side of the drainage.

The BLM owns land in the Elk City Township. The BLM has a management agreement with the Nez Perce NF that gives the USFS responsibility for snowmobile trails on BLM land. The BLM currently is completing an environmental assessment to allow outfitted trail rides on their lands (Personal comm. Grussing 2002). The BLM has no developed recreation sites in the area.

The Red River Wildlife Management Area is a former ranch owned by the Idaho Department of Fish and Game. An accessible, covered overlook offers year-round wildlife viewing in the meadows along the Red River.

Outfitters and Guides

There are a number of outfitter and guides licensed to work in the South Fork Clearwater River basin (Outfitters and Guides Licensing Board 2001). Outfitters and guides are licensed to lead an array of recreational activities from big game hunting and fishing to backpacking and horseback riding.

5.11 Culture and History

Native American

Since time immemorial, the Nez Perce have used and occupied large portions of the Snake and Clearwater River Basins, including the land and waters of the South Fork of the Clearwater River. (Nez Perce Tribal Executive Committee draft comments 11/17/2004) They fished the streams, hunted in the woodlands and dug bulbs of the edible camas lily on the high plateaus. (US DDOI NPS Nez Perce National Historic Park brochure) The Nez Perce Tribal members grouped themselves in small semi-permanent villages, with groups of villages combining to form bands (Landeen and Pinkham 1999, Walker 1978). There was no permanent political body, but each band relied on the older males who came together as a council as needed. The Tribes preferred local leadership to centralized authority (Walker 1978).

The Nez Perce Tribe considers salmon to be a part of their spiritual and cultural identity. The Native Americans Claims Commission concluded that the Native Americans economic cycle could be described as ten months of fishing and two months of berry picking, while hunting year-round. Each band had its own fishing places, which were respected by other bands (Landeen and Pinkham 1999). Important changes came with the acquisition of horses in the early 18th century. The Nez Perce and the Shoshone-Bannock increased their areas of travel. Both of these Tribes were wealthy because of the resource abundance of the central Idaho mountains and valleys and their use of horses for travel, hunting, and defense. Both Tribes developed class societies based on wealth, which in turn was based on the ownership of horses (Walker 1978). The Nez Perce Tribe pastured large bands of horses throughout the basin. It is also known that the Tribe practiced fire management.

Changes came again with the influx of euro-Americans in the 19th century. In 1836, Presbyterian missionaries introduced Christianity to the Tribes, creating religious divides that influenced tribal government, treaty negotiations, and tribal and individual wealth (Landeen and Pinkham 1999). Conflicts with new settlers arose over access to lands and streams. The federal government

became involved, and the Tribes entered into treaty negotiations during the middle part of the 19th century. Tribal governmental systems changed; the U.S. government's demand for a single authority figure to act for the entire Tribe was largely responsible for the creation of the head chief position (Walker 1978). The Nez Perce Tribe ceded tribal lands in the Treaty of 1855. The Nez Perce Reservation boundaries were further reduced by the 1863 Nez Perce Treaty. The 1893 Allotment Agreement served to open the Reservation to settlement by non-Indians. (Nez Perce Tribal Executive Committee draft comments 11/17/2004)

Tribal treaty rights apply to the "ceded territories," areas beyond the current Reservation boundary that encompasses the entire South Fork Clearwater River basin. Excerpts from the Treaties of 1855 and 1863 describe these rights. (9-18-02 SFC TMDL pg. 26)

- 1855 Treaty, Article 3: "The exclusive right of taking fish in all streams where running through or bordering said Reservation is further secured to said Native Americans; as also the right of taking fish in all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land." (9-18-02 SFC TMDL pg. 26)

- 1863 Treaty, Article 8: "The United States also agrees to reserve all springs or fountains not adjacent to, or directly connected with, the streams or rivers within the lands herby relinquished, and to keep back from settlement or entry so much of the surrounding land as may be necessary to prevent said springs or fountains being enclosed; and, further, to preserve a perpetual right of way to and from the same, as watering places, for the use in common of both whites and Native Americans." (9-18-02 SFC TMDL pg 27)

The General allotment Act of 1887 aimed at giving individual Native Americans title to 40 to 160 acres of land in the belief that land ownership would further assimilate them into the non Indian culture. The unalloted land was sold to the general public. Over time, more than 70% of the Reservation land was in non Native ownership. (US DDOI NPS Nez Perce National Historic Park brochure)

Nez Perce Conflict

The 1863 treaty between the U.S. and the Nez Perce Tribe reduced their Reservation lands. In 1867 the U.S. began a campaign to move the Nez Perce onto the smaller Reservation. Approximately ten years later in 1877, the Nez Perce who had resisted were informed that they would be moved forcibly onto the Reservation. This group of "non-treaty" Nez Perce began a journey, including battles, skirmishes and deaths to Nez Perce and white settlers alike that spanned parts of Oregon, Idaho, Montana, and Wyoming. Ultimately the Nez Perce were forced onto the Reservation. Their journey is documented and commemorated as the Nez Perce National Historic Trail. Included on this trail are the Cottonwood Skirmishes and Clearwater Battlefield park sites in the Clearwater River basin. For more information on the trail or the park, contact Nez Perce National Historic Park, Route 1 Box 100, Highway 95, Spalding, ID 83540 or go to the website http://www.fs.fed.us/npht/index.shtml.

Tribal management of land and water resources

As a sovereign tribal government, the Nez Perce Tribe has sovereign powers to regulate its lands, waters, and people. The Nez Perce Tribe is governed by the nine person Nez Perce Tribal Executive Committee (NPTEC), whose authority is recognized by a Constitution and Bylaws

originally adopted in 1948. The NPTEC has authority to regulate the lands and waters within the Reservation, as well as the exercise of treaty-reserved hunting, fishing, gathering, and pasturing rights reserved in the 1855 Treaty. As a co-manager of natural resources, the Tribe works closely with its federal, state, local, and tribal partners to address important natural resource management issues. (Nez Perce Tribal Executive Committee draft comments 11/17/2004)

The Nez Perce Tribe owns about 101,000 acres in the basin (Nez Perce Tribal Executive Committee draft comments 11/17/2004) although about 20% of the land in the basin is within the Nez Perce Tribal Reservation boundaries. (9-18-02 SFC TMDL pg. 26) The Reservation is about 780,000 acres in total with approximately 90,000 acres owned by the Tribe and Tribal members. (South Fork Clearwater River Landscape Assessment pg. 21). Currently the Nez Perce Tribe has 3,292 enrolled members.

Numerous Nez Perce religious and cultural sites are identified and protected in the South Fork Clearwater River basin. In most cases, their locations are not available for public disclosure in order to protect the integrity of the sites. Nez Perce tribal members continue to use the basin to exercise their treaty fishing and hunting rights.

National Register of Historic Places

Within the South Fork Clearwater River basin, there are several sites on the national register of historic places. These sites include the Grangeville Savings and Trust, Gold Point Mill in Elk City, Moose Creek Administrative Site, the State Bank of Kooskia, and St. Gertrude's Convent and Chapel in Cottonwood. There are others in the Nez Perce NF but not within the basin.

5.12 Forestry

A majority of the land in the basin is forested. The eastern portion of the basin is nearly all forested land. Management of the forested lands has resulted in the existing conditions as reported in the USDA Forest Service's South Fork Clearwater River Landscape Assessment:

- Forest succession, fire suppression, and timber harvest have resulted in declines in large open-growth Ponderosa pine. Early seral, intolerant species like lodgepole pine and western larch, have also declined with suppression.
- Whitebark pine is in serious decline from blister rust, fire exclusion and mountain pine beetle. Western white pine, never abundant in the basin, has also declined from blister rust.
- Grand fir, Douglas-fir, and subalpine fir have increased.
- Early seral structural stages, including forest openings, seedling and sapling, and pole stands, with fir snags and down wood, have decreased because of fire suppression. Medium and large tree classes have increased in most areas, except larch and Ponderosa pine forests.
- Large patches of fire-killed snags have declined with fire suppression. Large diameter snags have declined where timber harvest has occurred.

5.12.1 Fire Management

Fire was a pervasive agent of change within the basin before Euroamerican settlement. Fire Suppression became effective by about 1940. Fires affected almost 6,000 acres per year before 1930 and since have burned about 400 acres annually (U.S. Forest Service 1998).

An increase in medium and large tree classes in most settings and reductions in young tree classes

and shrublands have resulted from fire suppression. Shade tolerant tree species have increased and stand densities have probably increased over historic conditions in some settings. One consequence of this is increased risk of insect and disease activity and more severe fire (U.S. Forest Service 1998).
For more detailed information on fire disturbance frequency, size and severity please see the Fire Disturbance section of the South Fork Clearwater River Landscape Assessment, available on the Nez Perce NF website http://www.fs.fed.us/r1/nezperce/pua_sf_clw/index.html.

5.12.2 Timber

Timber was harvested from the basin as early as 1860 and the first sawmill was built in 1863 (USFS 1999). By 1900, seven sawmills were operating in the basin. The first commercial harvest began in the 1940s (USFS 1999). Early timber harvest selected high value species.

Currently there are two lumber mills operating in the basin. In 1958, Shearer Lumber Products mill opened. The same mill, now owned and operated by Bennett Forest Industries, may be relocated to the Lewiston area. (Idaho Statesman 3-6-03). Clearwater Forest Industries has a mill now in Kooskia. A large demand for timber resulted in an increased harvest in the basin during the 1960s and 1970s and clearcutting was the primary harvest method (USFS 1999). Since the 1980's the trend has been away from clearcutting, but some is allowed under current open contracts (McGee 2002). Timber harvest has declined on the Nez Perce NF in the basin since the 1980s, although timber sales are ongoing (Table 21).

The Bureau of Land Management (BLM) manages about 12,000 acres in the basin (Haaland 2002). All BLM land is in the Elk City Township. In 1996 the BLM harvested 3.2 mmbf from the Forgotten 400 timber sale located in section 34. Over the last ten years, The BLM harvested approximately 500 mbf from small sales throughout the township. Within the next three years, the BLM plans to harvest approximately 8 mmbf from the southwest portion of the township.

In addition to timber harvested from the Nez Perce NF and BLM land, the Idaho State Department of Lands (IDL) has 2,400 acres in the basin and conducts periodic timber

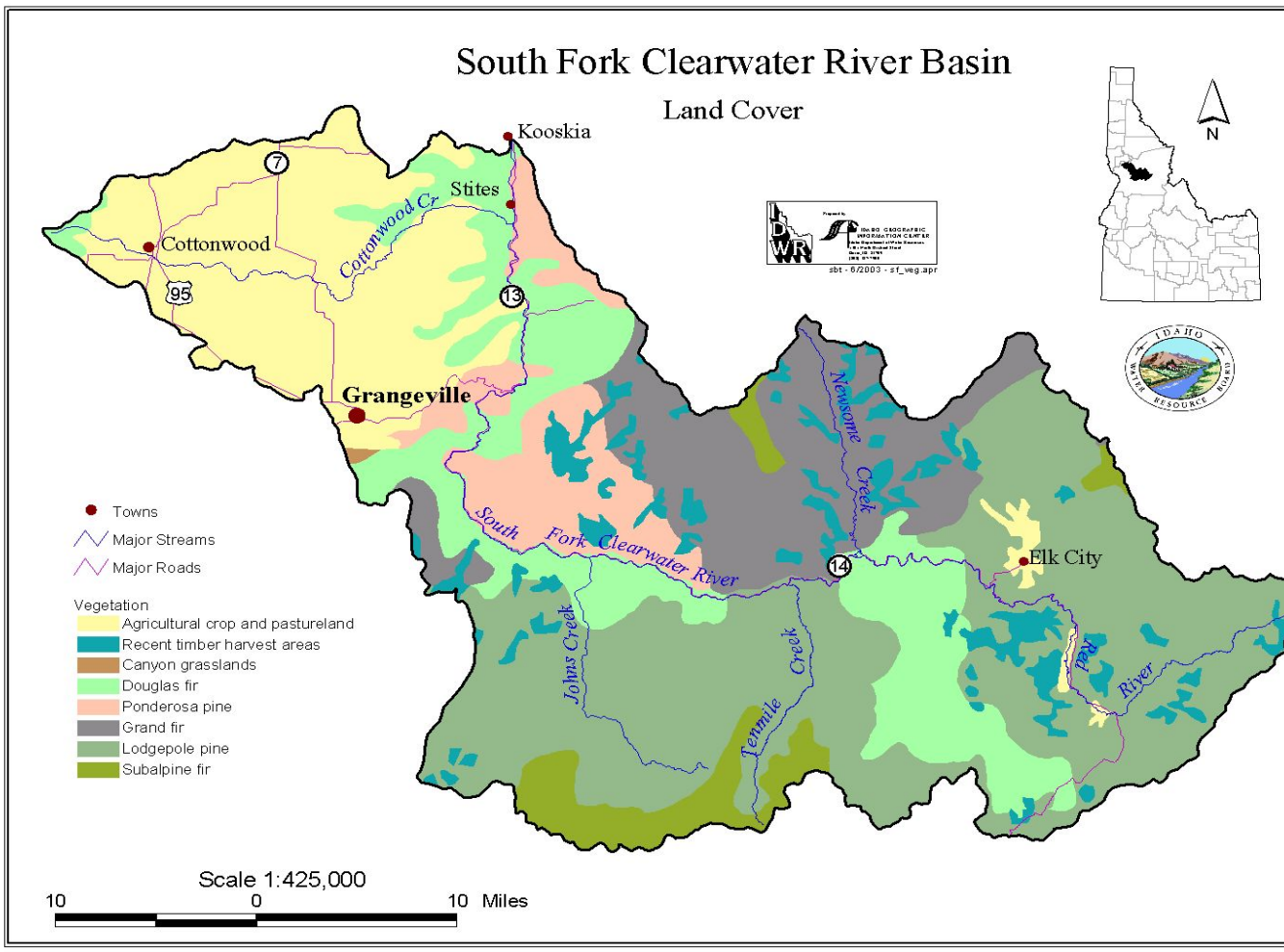
Table 21. Sawlog volume of timber sold from the South Fork Clearwater River basin.

Year Periods	Total MMBF Sold	Mean MMBF Sold Per Year
1971-1975	289.3	57.9
1976-1980	284.3	56.9
1981-1985	224.4	44.9
1986-1990	221.0	44.2
1991-1995	91.8	18.4
1996-2001	72.4	14.5

sales (Bates, IDL, 2002). Approximately 8 mmbf of timber were harvested from state lands in the last ten years. All the harvest from these sales was selective with the retention of a variety of tree densities in each sale area. Plans are to manage all the state land in the South Fork Clearwater River basin on an uneven aged basis.

There are also timber sales on private lands. Private forest lands generally fall under two categories. Industrial land belongs to timber companies or corporations and is primarily managed for long-term timber production. During the period from October 2001 to October 2002 approximately 5.8 mmbf were harvested from these lands. Non-industrial private forest land (NIPF) is the second category. Landowners in this category have a variety of parcel sizes and land objectives. Approximately 3.7 mmbf were removed from NIPF lands from October, 2001 through October, 2002 in the South Fork Clearwater River basin. Timber sales on both types of private land have been regulated by the State of Idaho's Forest Practices Act since 1974. Harvest of timber from private land is mostly selective with "uneven age management", although clearcutting occurs on a small percentage (5% to 10%) of the harvests (Bates, 2002).

A significant challenge in the basin is forest health. The number of dead and dying trees in some areas in the basin is a major forestry issue. Fuel reduction needs to be addressed. How these issues are resolved could be major factors in water quality in the basin.



Map 9. Land Cover.

5.13 Agriculture and Grazing

Domestic sheep and cattle were brought to the basin in the mid 1860s during the gold rush. Livestock increased with the number of settlers, and operations were concentrated in suitable areas around major trail heads leading to the large mining camps. The livestock industry thrived on rangeland of the area. Stites was the major livestock shipping location for the county.

In the mid 1800s settlers began moving into the basin, establishing homesteads and ranches. Larger areas were put into crop production with the development of mechanized equipment. Agricultural land use occurs predominantly in the Three Mile Creek, Butcher Creek, and Cottonwood Creek sub-watersheds and on the Camas Prairie.

The majority of cropland is devoted to dryland agriculture. The major crops are winter wheat, spring wheat, barley, peas, lentils, and canola. Most of the cropland is on gently sloping, well-drained soils. Farming practices include conventional tillage for seedbed preparation, plow, disc, harrow, fertilization. Crops are generally grown in rotation with grain following a legume or canola.

5.14 Mining

The South Fork Clearwater River basin's history is closely tied to mining. Deposits of gold and other valuable metals led to the first occupation of the area by white miners and settlers (USFS Landscape Assessment). Placer gold reportedly was discovered in a tributary of the Clearwater River in 1857 (Thomson and Ballard 1924). The first major gold discovery in the South Fork Clearwater River basin was in June 1861 near present day Elk City.

Early placer mining was done with hand tools and sluices and rocker boxes to remove gold from streams in the upper part of the basin. By the mid 1860s extensive ditch construction allowed the first hydraulic mining to occur. By the mid 1920s, an estimated $30 to $60 million of gold had been placer mined in central Idaho (Thomson and Ballard 1924). Placer and hydraulic mining continued, at fluctuating levels through the 1930s.

"Of all the historic human activities that have occurred in the assessment area, large scale dredging has had the most direct negative impact on streams," (USFS, Landscape Assessment 1998).

Lode, or hard rock mines were prospected as early as 1870. The Buster mine at Elk City was the first quartz mine to be opened and that was in 1884 (Thomson and Ballard 1924). The first mill in the basin was built in 1902. "However, the isolation of the mining district presented problems that rendered local treatment of the base ores unprofitable. The problem of transportation was the all-important factor governing the operation of those mines that had been producing," (Thomson and Ballard 1924). At that time, the road from Elk City to Grangeville did not exist and travel to the ore-rich part of the basin was difficult over a 53-mile wagon road between Stites and Elk City.

Currently there are two active reclamation permits for gold mines in the basin. One is for the Idaho Consolidated Metals surface mine near Elk City. The other is for a placer operation in the headwaters of Five Mile Creek.

Aggregate

There are two active reclamation permits for aggregate sources in the South Fork Clearwater River basin. Both are for gravel sources used by the Idaho Department of Transportation. They are located near Elk City.

Recreational Dredge Mining

Recreational dredge mining is allowed for specified times on designated sections of Idaho's rivers and requires a permit from the IDWR. The South Fork Clearwater River is open for recreational dredge operations from July 15 to Aug. 15. There are special requirements for recreational dredge mining on the South Fork Clearwater River to mitigate impacts to salmon and salmon habitat.

Recreational dredging equipment must have an intake of 5 inches diameter or less and a rating of 15 horsepower or less. A stream channel alteration permit is required for larger dredges. Dredge operations must be at least 100 feet apart. And, operations on a national forest must comply with Forest Service mining regulations.

5.15 Navigation

There is no commercial navigation within the South Fork Clearwater River basin. Historically, logs may have been floated down the South Fork Clearwater River during spring runoff.